

The Mining Journal

RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Valley, Wye Valley.

MYER of 5 Colopio, 100 Port Nigel, 5 West Prussian Mining, 20 Yarmouth

Quarry, 3 Royal (Westminster), and 10 Brighton Aquarium.

TIN SHARES, AND THE RISE IN TIN.—SPECIAL

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Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. LI.*

BY J. CLARK JEFFERSON, A.R.S.M., WH. SC.,
Certificated Mining Engineer.

(Formerly Student at the Royal Bergakademie, Clausthal).
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SECTION III.

In Bergström's improvement on Schumann's machine the only portion of the working which is not automatic is the gradual advance of the boring tool, or rather the cylinder, as the hole becomes deeper. This is performed by the attendant at the machine, and is liable to the great objection that if he advances the cylinder too far the stroke, and consequently the effectiveness of the blow, is greatly lessened, whilst, on the other hand, if he neglect to advance the cylinder there is great danger of the piston striking against the cylinder cover. This defect in boring machines was, perhaps, first remedied in Sommeiller's machine.

Sommeiller's boring machine consists of a cylinder 6 centimetres in diameter and 20 centimetres long. The piston, which is driven by compressed air, makes 200 complete strokes per minute. The piston rod is carried through both cylinder covers, the front part, which is of great length, passing through guides in the frame of the machine is provided at its fore end with a socket, into which the borer is fixed. The valve motion is much different from that of an ordinary steam-engine, and is worked independently of the main piston by means of a special engine. This auxiliary engine is fixed on the frame of the boring machine behind this, and has a cylinder 6 centimetres in diameter and 10 centimetres long. By means of a connecting crank it drives a short cross shaft, to one end of which a bevil wheel is attached. This wheel gears in with a second, fixed on a shaft, which passes longitudinally over the boring machine, and resting on bearings, or on short standards, fixed on the main frame.

The boring machine proper is provided with a valve chest, which communicates with the cylinder by three openings. One of the inlet ports and the exhaust port (which are placed close together) communicate with the back part of the cylinder; the other port, which is placed somewhat more forward, and passes into the front one of the cylinder, keeps the front end of the cylinder in constant communication with the valve chest, which is always filled with compressed air. The valve chest is placed towards the back part of the cylinder. The forward motion of the piston is caused by difference in the total pressure on the front and back side of the piston. For this purpose that part of the piston-rod which passes through the front cylinder cover has a much larger diameter than that which passes through the back cylinder cover. Both entrances of the ports into the cylinder are placed at some distance from the ends of the cylinder, so that there is always a cushion of compressed air between the cylinder cover and the piston.

The reciprocating motion of the slide valve is caused by a cam placed on the longitudinal shaft over the cylinder, and which is driven, as we have before mentioned, by the auxiliary engine, by the intervention of bevil gearing. When the valve is moved forwards compressed air enters through the back ports into the cylinder behind the piston, and drives it forward, causing the blow of the drill against the rock. The pressure on the back of the piston amounting to about 209 lbs., and that on the front end of the cylinder about 88 lbs., an effective pressure, therefore, of 121 lbs. drives the tool forward, and a pressure of 88 lbs. brings the piston back. The pressure of the compressed air is usually about 5 atmospheres.

The frame on which the machine rests consists of two beams, 2.7 metres long, 3 centimetres broad, and 5 centimetres deep, placed at a distance of 9 centimetres apart. On the inner side in the centre the frames are notches, in which a worm-wheel, or large screw, works; and on the underside, toward the front end, they are provided with notches into which a forked catch fits.

The gradual forward motion of the cylinder as the bore hole becomes deeper is caused by the above-mentioned screw, which fits into notches in the frame. The screw is attached to, or slides over, the back portion of the piston-rod; the piston-rod can move backwards and forwards through a hole in the centre of the screw, without carrying the screw with it, but it cannot be rotated without at the same time rotating the worm wheel.

On the long longitudinal shaft over the boring machine an eccentric catch is attached (behind the cylinder), which works into a ratchet wheel provided with 16 teeth, which is situated on the back projecting part of the piston, and which must rotate with the ratchet wheel, though the backward and forward motion of the piston is not shared in by the ratchet wheel. During each rotation of the long longitudinal shaft the eccentric catch moves the ratchet wheel through the space of one tooth, and consequently as each rotation of the cam on the longitudinal shaft causes a blow of the drill, a complete revolution or rotation of the borer for every 16 blows of the machine. As the piston thus makes one complete rotation during 16 blows of the drill, the screw on the piston advances the cylinder through the space equal to the pitch of the screw during the same time. The penetration of the borer, however, depends also on the hardness of the rock, and consequently without any further arrangement the liability to breakage and to stoppage would be greater than in the case of Schumann's machine, which might with great care be regulated by hand. Sommeiller's machine, however, has the advantage of regulating this automatically.

The large screw which sits loosely on the piston rod only rotates when in gear with a sliding clutch, which constantly rotates with the piston. The sliding clutch is kept (under ordinary circumstances) constantly pressed against the screw by means of a spiral spring, except when held back by an arrangement under the cylinder. This arrangement consists of a rod, the back end of which clasps the clutch or sliding catch. The front end, which is forked, fits into the notches on the under side of the frames, being pressed upwards into the notches by means of a spiral hinge. The extreme end of the rod carries a single crescent-shaped projection in the centre of (slightly below) the two frames. The front part of the piston rod carries a bell-shaped collar. When the borer does not penetrate fast enough the catch, by fitting into the notches under the beams, holds back the clutch (through the intervention of the long rod) from contact with the screw, which is thus not rotated, so that no further forward motion of the cylinder can take place. When, however, the borer has penetrated far enough, the collar on the piston rod comes in contact with the crescent-shaped projection, and presses it down, together with the catch, which otherwise fits in the notches on the under side of the frame. The spiral spring can now push forward the clutch into contact with the screw, which is thus caused to rotate, when a forward motion of the cylinder takes place until, the penetration of the drill being so slow, the catch on the rod again comes into contact with the notches on the under side of the beam, and holds the clutch stationary during any further advance of the cylinder, which thus, together with the worm wheel, or screw, recedes from the clutch, which is thereby disengaged, and no further advance of the cylinder takes place until the borer, having penetrated far enough, again releases the catch on the rod.

In order to clear the bore holes water is constantly injected from a pipe brought near the mouth of the bore hole, under a pressure of 70 lbs. to the square inch, thus keeping the hole clean, and the borer cool. The weight of the machine is about 440 lbs., and one machine is capable of boring from 8 to 11 holes, 1½ in. diameter and 3 ft. deep, per hour; three separate borers, from 2 ft. to 6 ft. in length, being used to each hole as it becomes deeper. On the average the borers themselves were worn away less and blunted less often, so that they were capable of doing from five to nine times the work that they effected when used in the ordinary way by hand.

In driving the Mont Cenis Tunnel about ten of Sommeiller's machines were placed upon one carriage at the end of the drift, so that from 60 to 80 holes were bored within the six-hours shift, and a like length of time was occupied in the removal and replacing of the machine, charging and firing the holes, and removing the debris, so that an advance at each end of 7 ft. per day was obtained. The holes were mostly horizontal, those near the top being inclined upwards, and those near the floor downwards. The diameter of the holes varied from 2½ to 3 centimetres, and were placed in horizontal rows. In order also to weaken the rock larger holes, of 9 to 12 centimetres in diameter, were bored in favourable places, one being placed in the centre of the middle row. These larger holes were not charged. The central row was fired first. The work was completed in 40 months after its commencement.

Sommeiller's machine was tried at the mines at Mariehay, near Liege, for driving two levels, on each of which four machines were employed. The air was compressed by a double acting air pump, the cylinder of which was 30 in. diameter and 40 in. long, driven by a 40-horse power engine. The air reservoir consisted of several boilers of 140 cubic metres total capacity. The air at a pressure of from 45 to 75 lb. per square inch was led through a pipe 4 in. diameter down a shaft 412 metres deep, from which two branch pipes 2 in. diameter, conveyed the compressed air to the machines, the end connection being made with india-rubber piping.

Schwartzkopff's machine was devised for boring holes for blasting rocks on the Rhine, between Bingen and St. Goar. It is designed for boring holes 3 in. diameter and 3½ to 4 ft. deep. The frame of the machine is attached to a strong hollow cast-iron column, which has a long rack attached to it. A strong casting embraces the column, and by means of a long bolt and nut can be securely fixed or clamped at any height on the column. The back part of the casting is enlarged, to pass over the rack, and contains a toothed wheel, which gears into the rack. By means of a handle fixed to the pinion of the wheel the casting can be readily raised or lowered on slackening the clamp bolts. The front end of the casting forms two strong deep lugs, between which the end of the frame to which the machine is attached is inserted. A short thick shaft passes through the lugs and the end of the frame, thus forming a very strong hinge, the whole arrangement so far being somewhat similar to the attachment of the table of an ordinary drilling machine. The end of the frame can rotate about the shaft, passing through the lugs, so that the boring machine can be placed at any inclination, and by means of a long bolt and nut can be clamped in any position, and the hole bored at any desired inclination. In order to fix the column itself tightly and securely it is provided at the lower end with two sharp points, and at the upper end by a strong screw, similar to the arrangement described for Schumann's drill. The frame consists of a long flat casting, on which the cylinder and the rest of the machine can be slid. The casting, which is hollow, has a long screw running nearly the whole length of the frame, and over this screw a nut attached to the cylinder passes. The screw is rotated by means of a pair of bevil wheels by hand, so that the cylinder, and the rest of the machine, can be gradually pushed forward as the bore hole gets deeper, or withdrawn when it is necessary to use a fresh borer, or when the hole is finished.

The machine proper consists of a cylinder about 7 in. in diameter, and 5½ in. long, in which a narrow piston provided with a very thick piston rod, 4 in. in diameter, reciprocates, giving 1100 to 1200 blows per minute. The piston is driven by compressed air. The entrance and exit of the compressed air is regulated by one of Wilson's equilibrium valves. The reciprocating rotary motion of the valve is effected by means of a spiral-shaped cam attached to the end of the piston rod, which projects from the cylinder. This works upon a correspondingly shaped arm or lever attached to the valve spindle. The piston rod is not connected directly with the borer, but works like a steam-hammer on the end of the borer, or, rather, boring rod, which is guided by passing through a socket. The borer or cutter is atached to the rod, and in order to clear the bore hole the borer is formed out of a strong square steel bar, which has been twisted spirally. The rod, and with it the borer, are brought back ¼ inch after every blow by means of a spiral spring inserted in the back end of the socket. The stroke of the piston is about 4½ in. The slow rotatory motion of the borer is effected by means of a ratchet wheel containing 22 teeth attached to the end of the boring rod; the catch which works into this and moves it through the space of one tooth for every blow of the piston, is attached to the (reciprocal partial rotating) valve spindle. The machine weighs from 500 to 600 lbs., and is thus too heavy for ordinary underground use. The machine possessed the two disadvantages that when boring in mild rock the borer penetrated further than the strength of the spiral spring was able to withdraw it, and when, on the other hand, the spring was made sufficiently strong it greatly reduced the useful effect in harder rock.

LEAD MINING AND SMELTING IN CANADA.

The determination of the Frontenac Lead Mining and Smelting Company to commence smelting operations upon a regular business scale, in consequence of the very encouraging results of their two years' mining operations, was noticed in the *Mining Journal* of April 14, and the fact that the works have been put up, and some 50 tons of pig-lead already sent into the market from them, can leave no doubt as to the energy that has been displayed by the executive. From the date of its establishment the company has been quietly and unobtrusively pioneering its way, and although the geological formation in which it was proposed to work was known to be the mother of great hidden wealth the district chosen has proved to be richer even beyond previous expectations. The success achieved may probably be accounted for by the circumstance that it has been conducted almost as a private enterprise, although for convenience and simplicity it has been duly registered under the Companies Act, 1862-67. The property in the Dominion consists of the Frontenac Mine, near Wilbur, about 16 miles north of Kingston, where it has the mineral rights for more than a mile in length on a lode 12 feet wide, and hitherto of unfathomable depths, together with 200 acres of land. The company has acquired, or is in the course of acquiring, another similar property, with land and buildings, about 35 miles north-east of Kingston, which will be worked when it is in the interest of the shareholders to spend capital upon it.

For the erection of the smelting works the company has bought and paid for about 7 acres of land freehold in the north-east corner of the City of Kingston, with a water frontage of some 400 feet on the end of Lake Ontario, whereby it has rail and water communication for distribution of its produce to all markets of the world. Here there has been erected at great expense a complete smelting plant, constructed under the supervision of a first-class mineral chemist and practical smelter. The chimney is 153 ft. high, the horizontal flue conducting to it being nearly 400 ft. long, and able to accommodate at least a dozen furnaces as the concern grows; there are all the sheds for stores, offices for assays and business, residences for officers, and cottages for workmen; a pier has been run out about 80 feet long, and will soon be available for vessels of ample draught for all necessary purposes. These works were formally inaugurated on Sept. 21 by Sir John A. Macdonald, who put into the furnaces the first charge, and subsequently performed the ceremony of drawing the first pig, in the presence of all the elite and influential residents, who justly regard with great favour and interest this pioneer of a future grand industry for the Dominion, and there can be no doubt that in seizing upon this coign of vantage the directors have done wisely, as minerals being abundant, and coal being procurable from the States at moderate prices, their smelting works alone would produce handsome profits.

At the Frontenac Mine, between which and Kingston there are very good roads, and rail more than half the way, the operations have hitherto been rather of a preparatory than a gain-seeking character, the object of the directors having been first to lay a good foundation for future profits, and to prove and explore the mine. With these views they have availed themselves by contract of the services of the American Diamond Rock Boring Company's machinery, and have probed the lode to the depth of 230 ft., meeting all down with the most satisfactory and improving indications. With their own staff and workmen assisting, the shaft has been re-

gularly sunk to 180 ft., and beside the adit levels have been driven 40 and 30 fms. respectively, at depths of 8 and 18 fms. Stopping hitherto has not been the main object, but the lode yields generally 1½ to 1½ ton of galena per cubic fathom, sometimes going up to 2½ tons, but the former estimates can be relied on. In some places pure solid galena is found in large masses, denoting greater richness lower down. The conditions for working are regarded as decidedly favourable on all points interesting to miners, making the cost of extraction moderate. The mine is provided with all the requisite plant and machinery, including patent jiggers, and a new American Diamond Rock Boring Company have finished their contract the directors have the option of purchasing their machinery.

With a view to making their smelting works fully profitable the directors are negotiating for a large supply of very rich silver-lead ore, which after smelting will be treated by Pattinson's process. About 60 tons of specimen galena were sold in England last year, and assayed at Bristol and London for 82 to 83 per cent. lead. The first 50 tons of pig-lead which have been turned out for lead, new furnace in the first month have been placed for sale, and the lead is of a remarkably pure and soft character. The contract with the American D. R. Boring Company will be completed during the winter, and everything will be in readiness with the first opening of spring to work and smelt for profit, and no doubt is entertained that the smelting works alone will prove a source of handsome remuneration. The utmost satisfaction has been expressed by competent judges at the way in which Mr. Kilshaw's plans for the works have been carried out. It is understood that Mr. Stockwell entertains an idea of getting white lead from the galena direct, as well as manufacturing pig-lead, so as to secure a share of the profit of the white lead trade of the Dominion, and at the same time avoid the injury to the health of the workmen which the manufacture of white-lead from the pig necessarily involves, and the enterprise progresses rolling-mills and shot-car will be added to the general plant. The result of the smelting so far shows that 80 per cent. of the weight of galena put into the reverberatory furnace is realised in the shape of pig-lead—conclusive evidence that the ore is of high quality. With regard to the Frontenac Company itself it is mentioned that the directors, who are gentlemen of position, have with their immediate friends found the means to lay the foundation of the promising enterprise here mentioned, and that they do not hesitate in anticipating a very handsome return, as they have been enabled to establish everything upon a substantial and permanent basis, because it has not been a necessity with them to grasp at half-matured results.

THE MINERAL WEALTH OF PERU AND BOLIVIA.

It was briefly mentioned in last week's *Journal* that in treating of the history, products, and commercial resources of these States in his "Ten Years in South America," Mr. Dingman had given ample prominence to their mineral wealth; and although so long as the present disreputable state of the laws and the savage religious intolerance now prevailing continues it would be unreasonable to expect any very large amount of commercial development, an account of the natural resources of the country will be no less interesting. In a country the first article of whose Constitution declares the "religion of the Government is Catholic, and it will not permit the exercise of any other;" and where the general feeling of the people so far as Peru is concerned, is indicated by the declaration—"If I am to be rich I will be rich without working, and if I am to be poor I'll not work at all," no large amount of industry is to be expected, yet Mr. Dingman's tale about José, who was able to sum up his intentions and aspirations, is certainly worth repeating. José was a middle-aged man living all alone in a hut in the outskirts of the city of Callao, and spent most of his time in bed, never getting up to open the door before 12 o'clock in the day, and then when he finally did get up he moped yawning to a cluster of bananas near by, pulled off a lot, and then returned to lie down in the shadow of the hut to eat. His whole wardrobe consisted of a pair of drawers, a long shirt hanging loosely outside, and part of a crownless old hat. The attempt to shame him into doing at least a little work was always met with the reply already quoted. One day a person came early in the morning enquiring for José; he was shown the hut, but told that he could not see him, as he never got up before noon. The person went but soon returned, saying that José answered, but refused to open the door, although he told him that he was bearer of news that a fortune had been left to him by a deceased relative. Afterwards, about 10 o'clock a notary came, and together they went to look after José, but he was still in bed. The notary called to him to get up and let him in, for he had come to deliver him a cheque for \$10,000 left him by his aunt. "Push it under the door!" shouted José, and that was all they could get out of him, for get up he would not. That, Mr. Dingman remarks, may be called the superlative degree of laziness.

After an interesting account of the destruction of Callao in 1746, Mr. Dingman gives a very good account of Lima and its inhabitants, giving especial attention to the Gallinazos and Limenas. He describes the climate as very equable and renovating, and very healthy, after the foreigner has once acclimated, which is very soon in a country where there is so little variation in the temperature. The new comer is subject only to *terciada*, a kind of fever, and ague, which but rarely, if ever, is known to attack a robust person. The thermometer ranges from 70° to 75° in winter, and from 85° to 90° in summer. The absence of rain is compensated by a heavy dew almost every night during the winter months from May to October. There is no thunder or lightning, and earthquakes are so common, especially in the spring, that little notice is taken of them. The annual political revolutions give equally little annoyance to the inhabitants. The country, moreover, abounds in mines of gold, silver, copper, and coal, and inexhaustible coal-oil springs have been discovered in the northern part of the Republic. It is said that gold may be found in nearly all the passes, and nearly all the rivers from the Andes wash down the auriferous sands. The richest gold mines or diggings are in the vicinity of Tarma. The guano deposits and various other industries of the Republic are also fully referred to, so that a very accurate idea of its resources can be formed.

The volume devoted to Bolivia opens with an account of the Caracoles Silver Mines, which were discovered in 1870 in the Desert of Atacama, by José Díaz Gana, whose innumerable explorations have been the means of opening an extensive horizon to the capital and industry of Bolivia and Chili. It appears that Díaz Gana, not being satisfied with the result of his explorations on the borders of the desert, sent a part of his company to the interior to explore some mountains where he had reason to believe there would be found some rich veins of ore. Saavedra, Mendez, Porras, and Reyes arrived at the table-land which serves as the base of those beautiful grey mountains. Reyes, having first finished his repast, went climbing up the easy slope, and picked up loose pieces of silver where now are the Mercedes and Desada Mines, and followed on southward, picking them up in different directions, not knowing their value but thinking possibly they might be of service. Later on he joined Mendez and the others, who had also found loose pieces of ore, and had made marks in the lead with their knives. Two of them immediately started to the coast to inform their patron. They had been to Díaz Gana what Sancho Mundo was to Columbus. The discovery was made, and that dry and solitary desert a short time after was the centre of an active population. Díaz Gana baptised that emporium of riches Caracoles, and he was right. The fossils characterising the lias were abundant, and as a matter-of-fact he fixed upon this notable geological formation to give a name to his discovery. The young Chilean Francisco Basconan Alvarez is another of those untiring explorers who have helped to convert the desert into a field of labour and industry. After long and laborious explorations in Copiapo, Bolivia, and Catamarex in 1857 he returned to the desert in 1870, and discovered in Caracoles the group called

* "Ten Years in South America: Notes of Travel in Peru, Bolivia, Chili, Argentine Republic, Monte Video, and Brazil, comprising History, Commercial Statistics, Climate, Products, &c." By BENJAMIN S. DINGMAN. Part I, Peru and Bolivia. Part II, Bolivia. Montreal: Gazette Printing House. London: Trubner & Co., Ludgate-hill.

On account of its topographical position. The mines are from 10,000 to 15,000 ft. above the level of the sea, and among the richest may be noted the Desada, Merceditas, Flor del Desierto, Esperanza, San José, and Esmeralda. Then there are the Federico Erasuriz, San America, Salvadora, and a host of others, some of great promise, others worth little or nothing. The experiments made by men of science resulted in the encouragement of all kinds of enterprises, and Caracoles soon became an immense field of speculators disposing of large capitals. The merchants of Chili, both native and foreign, were the founders of these companies, the stock of which was sold at fabulous premiums. In Caracoles fortunes were made in a day, and not insignificant ones either, but of millions. But in this, as well as in other pursuits of life, all cannot have the same luck, and thousands went there only to bury their fortunes and their bones in the vain search for the hidden treasures. Throughout the book Mr. Dingman shows that he has been a careful observer, and that he has given his readers the full benefit of his observations.

ELECTRICITY FOR RECOVERING TIN FROM TIN-PLATE SCRAP.

Although the separation of the metals forming tin-plate scrap has been made to yield large profits in several places on the Continent, comparatively little attention has been paid to the subject in this country, and even in their application to the improvement of results, their utilisation appears to have been entirely discontinued. By means of a series of careful experiments with processes in which the agency of electricity is made use of, Mr. N. S. KEITH, of Brooklyn, New York, has ascertained that if scraps of tin-plate be separated and extended, the tin can be removed from all parts of the scrap simultaneously, and consequently the separation and recovery of the tin and iron can be effected with great rapidity. By a simple mechanical arrangement the scraps are moved progressively through a liquid electrolysing bath while under the action of the electricity and the solution constituting the bath, and consequently the tin scraps can be entered into and removed from the electrolysing bath in continuous progression as distinguished from changing a multitude of scraps simultaneously into the bath, leaving all them therein during the same period, and then removing them therefrom simultaneously. He has found, moreover, that if the scrap tin-plate in the bath be subjected simultaneously to the action of electricity and heat exceeding 160° Fahr. or thereabout, while in the electrolysing bath the tin may be dissolved and removed without material solution or oxidation of the iron which forms the body of the scraps.

The apparatus which he employs for effecting the separation is very simple, and consists of a vat for holding the electrolysing bath; an endless chain conveyor, or some substitute or equivalent thereof, for holding and moving the scrap tin-plate through the said vat, and for small scrap a cage or basket, which may or may not be made to revolve, a central electrical cathode, means for heating the liquid in the vat, and a galvanic battery, or some equivalent or substitute therefor, for the purpose of furnishing an electric current. In practice the scrap tin-plate is immersed in an electrolysing bath in the vat, and is connected with a galvanic battery, or other means of furnishing a current of electricity, in such manner that the scrap constitutes the anode for the current, while the vat itself, or some suitable conductor contained in it, constitutes the cathode for the current. Various liquids may be used for the electrolysing bath—in fact, any liquid may be used that will dissolve the tin when excited by electricity; he prefers, however, solutions which contain a quantity of free alkali, such as caustic potash or caustic soda. Any galvanic battery may be used to generate or furnish the electricity, or any of the magneto-electric machines, the requisite in this particular being a quantity current of sufficient amount. A current of intensity may be used, but he does not recommend the use of such a current. The vat or tank containing the liquid may be of iron, or any other metal or substance which will not be affected by its contents, but it is preferable that the vat should be of a material which will conduct electricity.

Scrap tin-plates, as usually found in the market, are curled or bent, and are tangled together in masses, so that some parts of each scrap are overlapped by adjacent scraps, or frequently by other parts of itself. On the other hand, the currents of electricity pass directly or thereabout from the surfaces of the anode in the electrolysing bath to those of the cathode. Hence, if the scraps of tin-plate remain in the mass while they are subjected in the bath to the action of electricity, the tin will be removed most rapidly from those parts of the scraps which are opposite the surfaces of the cathode, while the overlapped surfaces of the mass will be but slightly, if at all, affected. Therefore, according to Mr. Keith's process, the scraps are first separated and extended to such extent that their surfaces are not overlapped to any material extent, and they are subjected in this separated and extended condition to the electric action. For the latter purpose the scraps, according to one part of the invention, are placed upon the cross bars of an endless chain of rods or other moving frame connected electrically with the positive pole of the source of electricity, and this chain or frame is moved progressively into, through, and out of the vat, so that the scraps may be entered progressively into the bath, and removed progressively therefrom, and that the operation may go on continuously.

The solutions which he has used with success are—Caustic soda 1 lb., nitrate of soda 1 lb., to every gallon of water contained in the vat; or caustic potash 3 lbs., nitrate of potash 1 lb., to every gallon of water; or caustic soda 1-5th lb., and common salt 2 lbs., to every gallon of water. The proportions and constituents of the solution may, however, be varied as circumstances or the views of the different users may determine. The rods connecting the pair of endless wire-ropes may be plain iron or copper rods, or may be fitted with projections, hooks, or other appliances upon which the scraps may be hung, the only requisite being that when the scraps are on the rods the scraps are in electrical connection with the battery or its substitute. Heat is applied to the contents of the vat, either by building it in brickwork, forming flues like those of a steam-boiler, and communicating with a furnace, or by immersing in the tank a coil of iron steam-pipes, supplied with steam from a steam-boiler. The chain of rods being put into motion, the tin-plate scraps are separated from the mass of scraps by being picked up one at a time by the rods, and are hung upon the rods of the chain above the vat at the descending side of the chain, one end of each scrap being bent into a hook form for the purpose. The scraps thus separated and extended are by the movement of the chain carried progressively down into the bath, and upward at its opposite side, and when they are raised above the vat they are removed by children.

During the immersion of the scraps in the bath they are treated by the conjointed agencies of the solution forming the bath—electricity and heat. The tin is dissolved from the scraps, and separates at the cathode, and it is deposited in the vat in the condition of crystals of metallic tin. The materials thus deposited may be withdrawn from the vat through a faucet, without removing the cathode, or may be scooped out, and the tin matter thus recovered from the scrap tin-plates is washed, and either reduced to the form of black tin by the usual metallurgical processes, or is otherwise utilised. The iron of the scraps being cleansed of the tin is rendered useful for the purpose for which scrap-iron is used. The process being a continuous one, though but a comparatively small amount of scrap is under treatment at once, a large quantity can be disposed of in a given time, and much valuable metal, which is now worthless, can be utilised at a comparatively trifling cost. The solution constituting the bath remains practically permanent, it being necessary only to replace such water as may be dissipated by evaporation, and to add from time to time enough of the other constituent to replace the small quantity unavoidably removed with the iron scraps and not saved by washing them.

For the purpose of increasing the surface of the cathode, and bringing it into a position to work more satisfactorily in connection with the anode, a division plate of sheet-iron or other suitable material is arranged in the vat or tank between the entering and receding

portions of the chain of rods, so as to present an antagonistic surface to both the ascending and descending portions of the chain of rods when in motion. He finds it expedient so to proportion the breadth of the vat that the chain of rods is about 1 ft. distant from the surface of the cathode at each side of them. In place of constructing the vat or tank of iron it may be constructed of some non-conductor of electricity, and may have sheets or plates of iron, copper, or brass suspended in it at both sides of the chain of rods, and connected electrically with the negative pole of the battery, so as to form the cathode. In place of having the rods permanently secured to the chains or wire-ropes, it is convenient to have them hung upon hooks or other appliances attached to the chains or ropes. In such case the rods may be charged with scraps when separated from the chains or ropes, and then applied to them. The rods also may be removed from the chains, so as to facilitate the stripping of the scraps from the rods. The chains or rods may be moved continuously, or at short intervals as found most convenient, and if some parts of his invention are used without others, the scraps may be applied in a separated condition to a rack or frame of rods, which is lowered into the vat, left there long enough to permit the tin to be separated, and then withdrawn from the vat. Mr. Keith does not limit himself to the employment of a certain kind of solvent or solution, but prefers those which, under the conditions employed, have no dissolving or injurious effect upon the iron of the scrap.

GEOLOGICAL SOCIETY OF LONDON.

Nov. 7.—Prof. P. MARTIN DUNCAN, M.B., F.R.S. (President), in the chair.

Stephenson Clarke, Croydon Lodge, Croydon, Surrey; William Hunter, Sandhoe, near Hexham; and the Rev. W. Roberts, St. Leonard's-terrace, Chelsea, were elected Fellows of the Society.—Isaac Bayley Balfour, M.B., D.Sc., Inverleith-row, Edinburgh; David Burns, Geological Survey of England, Jermyn-street; Samuel Cooke, M.A., Assoc. Inst. C.E., Professor of Chemistry and Geology, Poona Civil Engineering College, Bombay; Henry Drummond, Glenelg Lodge, Stirling; Sandford Fleming, C.E., C.M.G., M. Inst. C.E., Durham Villas, Kensington; Rev. John Hodgson, M.A., the Vicarage, Kinver, Staffordshire; William Etheldred Jennings, B.A., School of Mines, Sydney, New South Wales; Henry Merryweather, Fairholme, Clapham; Robert Robinson, M. Inst. C.E., West Terrace, Darlington; Martin Stewart, B.A., Yorke House, Wakefield; George Eastlake Thomas, Wolverhampton; Robert F. Tomes, Weston-on-Avon, Stratford-on-Avon; and Irwine John Whitty, Assoc. Inst. C.E., of Giridih, East Indian Railway, Bengal, were proposed as fellows of the Society.—Oswald Fitch, Highbury New Park; John Hadkinson, Brunswick-street, Liverpool; B. Holgate, engineer, Atkinson-street, Hunslet, Leeds; H. F. Parsons, M.D., Gools, Yorkshire; and Edgar P. Rathbone, Duke of Norfolk's Nunnery Colliery Offices, Sheffield, will be balloted for as Fellows of the society.

The President announced that Mr. Frederick L. Woodward had been appointed Junior Assistant in the Library and Museum.

The following communications were read:—"I am directed by the Earl of Derby to state to you, for the information of the Geological Society, that his lordship has received a despatch from Her Majesty's Minister at Tehran, reporting that a mining engineer had arrived there from Berlin, who, at the request of the Persian Government, had been selected by Messrs. Siemens to ascertain what foundation there was for the reported existence of a rich vein of gold in the vicinity of Zangan; that he had visited the locality and reported that auriferous quartz does exist, but that he had not yet succeeded in finding any vein or deposit of the metal.—JULIAN PAUNCKFOTE."

2.—"Notes on Fossil Plants discovered in Grinnell Land by Capt. H. W. Feilden, Naturalist to the English North Polar Expedition," by Prof. Oswald Heer, F.M.G.S.

3.—"On our present knowledge of the Invertebrate Fauna of the Lower Carboniferous or Calciferous Sandstone series of the Edinburgh neighbourhood, especially of that division known as the Wardie Shales, and on the first appearance of certain species in the beds," by R. Etheridge, jun., F.G.S.

EXPERIMENTS IN GETTING COAL WITHOUT GUNPOWDER.

The question of the use, or rather disuse, of gunpowder in getting coal is more and more attracting the attention of mining engineers and those interested in collieries, and by many it is considered that powder will have to be entirely prohibited in fiery seams or where safety-lamps have to be used. The recent terrible explosions at Pemberton and Blantyre have brought the question to the fore, and various methods by which powder will be superseded have been suggested and tried. These include driving down the coal by means of wedges, and exploding cartridges with compressed air. The difficulty with the former method so far has been the trouble and time required in driving the wedges into the coal, and the machinery for the latter has not yet been satisfactorily completed. One of the best wedges invented appears to be that patented by Messrs. Lingley and Ackers, of Lower Ince, near Wigan, and this has been repeatedly tried with success, in fact it is now being used with advantage in some seams, and for the purpose of robbing down metal. It consists of a steel wedge and two clips, forming exteriorly when placed together a circle in transverse section. In the interior are grooves to receive the wedge, these being constructed so as to cause the clips to open parallel to each other when the wedge is driven into them. The wedge is constructed of Bessemer steel 1 in. thick, being 4 ft. long, and the breadth of the tapering from 2½ in. to ¾ in. The clips are 2 ft. 3 in. long, and are semicircular, the grooves tapering from ¾ in. to nil. As previously stated, much manual labour, however, is required in driving the wedges, and Mr. Israel Knowles, of the Pearson and Knowles Coal and Iron Company (Limited), who noticed this drawback in using the wedges at their collieries, conceived the idea that by applying hydraulic pressure the work would be supplied. He immediately tested the idea in a practical form, and finding it succeeded, secured its application by a protection order. Having had one of Lingley and Ackers' wedges fitted with an hydraulic ram he invited a party of mining engineers and others interested in collieries to witness a series of experiments with the invention, and to judge whether the new method in any way came up to the requirements of the times.

The experiments took place on Monday at the Moss Pits, Ince, of the Pearson and Knowles Coal Company, and amongst the gentlemen who took part in the proceedings were:—Mr. Israel Knowles; Mr. J. L. Hedley, Government Inspector of Mines; Mr. C. F. Clarke, Garwood Coal and Iron Company; Mr. Walter Topping, Cross, Tetley, and Company; Mr. James Hilton and Mr. J. Entwistle, Wigan Coal and Iron Company; Mr. J. Gerrard and Mr. W. Bullen, Ince Hall Coal and Cannel Company; Messrs. Kenney and Wall, Wigan, surveyors to the company; Mr. J. Smith, Bickershaw Collieries; Mr. J. H. Walker, mining engineer, and Mr. Robert Gledhill, Hindly Field Collieries; Mr. J. Latham, Moss Hall Collieries; Mr. E. Seddon; Mr. Durand, Sowerthorpe and Co.; Mr. James R. Knowles and Mr. J. Knowles. The party descended the No. 2 or upcast shaft to the Pemberton Five Feet Mine, and then proceeded along the main level to a downroad, a distance of about 150 yards from the shaft, the spot where it had been decided the day's experiments should take place. This place had been selected on account of its enabling the whole of the gentlemen present to witness the trials of the machine, and as soon as the party had inspected the preparatory arrangements which had been made, the experiments were commenced. A ½-in. hydraulic ram, worked by hand, was used, this being connected by means of wrought-iron tubing with the cylinder, in which a portion of the wedge was inserted, and the cylinder, 4 in. in diameter and 1½ in. in length, was bolted to the clips of the wedge by two bars, constructed so as to allow of the cylinder being moved to its original position when the wedge had been forced to the full extent of the stroke.

The first experiment was in a "strait" place on the end of the coal, 10 ft. wide, the coal being cut on the higher side. In this trial as well as the others the experiments, with a view to test the power of the wedge, were conducted in such a manner as to put the appliances at greater disadvantage than would be the case in the ordinary course of mining. The hole was placed on the lower side and was 3 ft. 6 in. deep, and the coal was holed a distance of nearly 4 ft. The wedge was placed in the drill hole, and in 17 minutes, 4½ of which were occupied in fixing and refixing the wedge and clips, the coal was successfully brought down. The weight of the coal dislodged was nearly 4 tons, and a very small proportion of this was slack. The second experiment was also on the end of the coal, this time with a side slope on the higher side. The length of the block was 12 ft., this being holed 4 ft. The drill hole was again 3 ft. 6 in. deep, and was placed on the lower side. In 7½ minutes after inserting the wedge the coal was brought down, forcing it off clear to the back of the holding on the higher side, and leaving some 6 in. on the lower side. The cylinder had to be moved once, and this occupied 2½ minutes, so that force was only applied 4½ minutes. Between 7 and 8 tons were estimated to have been got by this one wedge, and very little of it was slack or even small coal. The third attempt was more to see whether, with the assistance of the wedge, side cutting could be entirely done away with, or if this could not be attained, what labour would be saved by first using a wedge, and, as many of our readers are aware, side cutting is a very tedious and slow process. A place was selected on the face of the coal, 18 ft. 6 in. long, and this was holed 4 ft. deep. Drill holes 3 ft. 6 in. in depth were put in at both ends, and the wedge was first used in the one at the right-hand side. After being forced a distance of 2 ft. the side, although the coal was not forced off, was so shattered that a collier was enabled to cut it out and cut the side in 28 minutes, the time generally taken for this work being two hours or more. The coal cut was principally "round"—a marked contrast to the slack usually produced—and allowing for the time taken in wedging, showing a saving in time of an hour. The wedge was then put in the drill hole at the other side, but only brought part of the block down, although it was apparent to all present that the remaining portion of the coal had been so successfully loosened that it would be easily got by hand wedging, and that in a short time.

The party then ascended the shaft, and on adjoining to the engine-house, Mr

Hedley, on behalf of those present, thanked Mr. Knowles for his kindness in inviting them to witness the experiments. The trials were of great interest to all of them, and for his part he considered the result very satisfactory. He wished Mr. Knowles every success with his invention.—Mr. Walter Topping, in seconding the vote, said there could be no doubt that the question of using powder in coal mining would engage the attention of the Legislature at an early date, and that, therefore, it behoved all of them to watch with great interest all inventions which it was proposed to substitute for it in getting coal. The experiments that day he thought were very successful, and the step was one in the right direction, but he considered that the work would have to be done even yet more extensively.—Mr. Knowles briefly acknowledged the thanks, and said that the invention was only yet in its infancy, but he thought it would accomplish all that was desired. The machine was only tested for the first time a few days previously.

EXPERIMENTS WITH A ROCK-SALT CUTTING MACHINE AT WIELICZKA.*

The working of rock salt by the ordinary method of excavating with a pick and blasting the undercut mass is attended with the disadvantage of making a large amount of small coal, besides giving lumps of irregular form which are inconvenient for carriage. It has, therefore, been considered desirable to substitute, if possible, the use of cutting-machines for hand labour in the Wieliczka mines, and for this purpose experiments have been made with a machine supplied by Stanek and Reska, of Prague. The method of working the salt at present used is to divide it into rectangular blocks by grooves about 25 in. deep both at the top and bottom of the bed, and vertical cuts of the same depth from 6 ft. to 10 ft. apart. The blocks so released are brought down by wedging and broken up for sale into lumps varying from 30 lbs. to 88 lbs., and in order to satisfy these conditions it was necessary to employ a "Universal" machine, capable of cutting at any angle. The maximum depth of cut required is 30 in., and the vertical distance between the roof and the floor of the salt bed is 4 ft.

The cutting arrangement is similar to that of Winstanley and Barker's coal-cutting machine—i.e., a large toothed wheel carrying steel cutters on the circumference, mounted at the end of a lever so as to move radially while at the same time it is slowly rotated by a pinion, but unlike that machine the construction is, by reason of the various directions in which it is required to work, exceedingly complicated, there being no less than four changes of motion between the driving axle and the cutting wheel; the arrangements being generally similar to those of an engineer's radial drilling machine, with additional movements for varying the plane of the cutting wheel. These together with views of the machine in the different working positions are set out in full detail in the accompanying plates. The machine is self-acting, being moved on a line of railway by a hauling chain passing over a drum under the framing, the ends of which are made fast to fixed traverses at either end of the gallery. The driving engines have cylinders with a stroke of 7-5 and 12 in. Compressed air is used as the motive power. With a pressure of 2-36 atmospheres, the engines make 100 to 120 revolutions per minute, which is reduced by the various trains of gearing wheels to 8 revolutions of the cutting wheel. This has 20 teeth, and 7 cutters to every 4 teeth, so that 35 blows are struck in each revolution, or 280 per minute, against the surface of the rock. The maximum rate of movement of the machine in undercutting along a face is 4 in. per minute, the corresponding depth of cut being 0-475 in. per revolution.

The experiments were commenced in July, 1876, upon a bed of salt nearly 6-5 ft. thick, but varying irregularly in dip in all directions, upon which a working face of 105 ft. had been prepared. The horizontal cuts were put in from 0-4 in. to 1-2 in. above or below the actual floor or roof of the bed, partly to prevent the small salt being mixed with dirt from the rock, and partly to prevent the roof scaling into the workings, which invariably happens when the entire thickness of salt is removed.

The results of eight months' working show that the machine can cut horizontally 59 square feet per hour. When slitting vertically to a height of 5-9 ft. the reversal of the cutting frame headstock occupies about three-quarters of an hour, so that the rate of progress is reduced to 30 or 40 square feet per hour.

The cutting points, made of cast-steel, will cut a surface of 452 square feet in clean salt without requiring to be reset, and each set will bear sharpening five or six times before they are worn out, or 2712 square feet can be cut with one set of points. If, however, bands of anhydrite or sandstone are met with, the points are ground off immediately.

The average cost of cutting by the machine appears to be about 90 kreuzers (21-6d.) per square metre, as against 1-15 fl. (27-6d.) per metre paid for handwork. The principal advantage is, however, to be found in the diminished proportion of small salt to lumps, the latter being worth about 7s. per ton more than the former. In the ordinary way, working by hand, the percentages are lumps 75, and smalls 25, while by the machine 83 per cent. of lumps and 17 of smalls are obtained.

Bessemer steel is employed for all the moving parts of the machine, except the cutting wheel and driving pinion, which are of crucible steel. The cost is about 430l., and that of the air-compressing arrangements, which are designed to drive other machines as well, 990l.

—By A. JANOTA: Oesterreichische Zeitschrift für Berg- und Hüttenwesen.

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

PUDDLING AND OTHER FURNACES.—The invention of Messrs. CADDICK and MAYBERRY, of Middlesborough, relates to furnaces employed for puddling, heating, and melting iron, and for other metallurgical operations, having reference chiefly to the combustion chambers of such furnaces. They make the combustion chamber of a furnace to act as a producer or generator of combustible gases, constructing it of fire-brick enclosed in an iron casing, and outside this casing they provide a second casing, so that there is an air space between the two casings. There are passages from this space through the inner casing and fire-brick through into the combustion chamber, some of these passages being at a low level, entering that part of the chamber which is occupied by fuel, or entering a closed ash-pit or space below a fire-grate on which the fuel rests, and others of these passages opening into the combustion chamber above the level of the fuel therein. There is also a large passage or throat from the upper part of the combustion chamber into the bed of the furnace. The air space between the casings is supplied with air entering by an aperture from the external atmosphere, or forced in by a fan or other blast. The air entering this space, and becoming heated by contact with the inner casing, passes by the several passages into the combustion chamber. The air which enters by the lower passages serves to maintain the combustion or partial combustion of the fuel, producing inflammable gases, and the air which enters by the upper passages mingles with these hot gases, producing flame, which passes by the throat into the bed part of the furnace, and acts on the metal or material therein; also the passage of air through the space between the casings has the effect of keeping the outer casing cool, so that not only is the heat radiating from the combustion chamber thus utilised for warming the air supplied to it, but also the exterior of the chamber is so cooled that workmen employed at the furnace are not incommoded by the neighbourhood of the combustion chamber. A producer or combustion chamber as described may serve for a single furnace bed, or there may be several furnace beds arranged round one such producer, a throat therefrom being provided for each of them.

UTILISING WATER POWER TO COMPRESS AIR.—With a view to utilise water power by converting it into more manageable pneumatic power, Messrs. SWAN and HUGHES, of Formby, Lancashire, construct an annular trough in which a weighted chamber, like a gasometer, floats in water or other liquid; within the annulus is a second covered chamber into which the water from the head is let; this water forces the air up through a valve into the floating chamber, raising the said chamber; when it has been raised to its full height the valve between the floating chamber and the central one is then automatically closed, and the air from the floating chamber is utilised for work. The water falling in the central chamber draws air by means of a pipe and valves from another chamber, in which is another similar weighted moveable chamber, which by the

city, represented by MM. Eiffel and Co., has just obtained a concession in Portugal, an iron bridge of 533 ft. span having been thrown across the Douro at Oporto by the Royal Portuguese Railway Company, who entrusted the work to MM. Eiffel. The works of the Universal Exhibition building at Paris have been advancing rapidly of late.

Meetings of Public Companies.

KNYSFAIG SLATE QUARRIES COMPANY.

The general half yearly meeting of shareholders was held at the offices of the company, 2, Gresham Buildings, Basinghall-street, on Tuesday, Dr. L. M. THOMAS (a shareholder) in the chair. Mr. E. W. PEARSON (managing director) reported that with the exception of a slight mishap the work at the quarries had been satisfactorily proceeded with since the date of the previous meeting. A fair amount of profit was being realised out of the Grove Chamber until a fall occurred, the debris of which occupied the chamber several weeks in its removal, whilst the material was so much as to be practically worthless. Having regard to the fact that the slate is so near the top of the mountain to yield any sufficient paying quantity of the larger descriptions of slates, the company determined to complete the level, some time since began at the opposite side of the hill, and at a depth of some 60 yards, where, as was explained, owing to the greater pressure from above, much larger and more profitable slates might be found. Accordingly the work at the Grove Chamber was suspended, and the men were set to work at completing the level, which is now carried to a depth of 280 yards, leaving only about 30 yards more to be driven before the level will be reached. The amount required for this additional work was only about 2500, and this additional expenditure, it was stated, would enable the company to commence in about three months to earn good profits. An announcement was then made that, in deference to the wishes of an important section of the shareholders, the vendors, who by the terms of an original contract were entitled to 32,000, of the property, had agreed to accept 12,000, less, thus reducing the company's capital from 48,000 to 36,000. The vendors had further undertaken to the company, to the extent of 4000, a bonus upon the full paid shares coming to them, to the extent of 4000, a bonus upon the proportion of one share to every two shares subscribed for by the public, and the shareholders participating equally in the benefit of this arrangement. A general and satisfactory agreement had also been concluded with the vendors, who were entitled to the immediate payment of a large amount, but with a view of aiding the company, had assented to the payment of the principal and over for three years, interest being provided for. The discussion which followed, a unanimous opinion was expressed that the work should be vigorously prosecuted without delay, seeing that, in all human probability, a very small further outlay would result in large returns at an early date, the slate trade being still exceptionally good, and numerous offers having been made in rebuffs to purchase at the highest Port Macao prices all the slates the company could produce. A resolution authorising the making of a second call was then passed, shareholders being invited not only to induce their friends to take shares, but also to take up in full in respect of their own. Dr. Thomas and Mr. W. R. Morton (the latter of the Stock Exchange) were elected directors, and the proceedings closed with a vote of thanks to the Chairman.

HEMANSFOOT.—At a meeting of shareholders held at the mine, Tuesday, the accounts showed a profit on the four months' work of 200, 6s. 2d., a balance of assets over liabilities of 1355, 13s. 2d., and a cash balance of 691, 11s. 8d. The manager, Capt. T. Trevillion, in concluding his report, congratulated the shareholders on a general improvement in the mine, and is sanguine that better days are in store, and shall now not only believe in profits, but ere long anticipate dividend. [The report is among the Mining Correspondence.] [For remainder of Meetings see to-day's Supplement.]

THE VAN MINES—MONTHLY REPORT.

The 14-Seaham shaft is sunk 9 fms. below the 105. The cross-cut at the end of the shaft is driven north 55 ft.; the last 6 ft. has been unproductive, although a strong lode, and I intend driving the cross-cut right into the footwall along the width of the lode. The 105 is extended west of shaft 62 fms. There is a good mixture of lead on the north side of the level, but as we are aiming at a continuous run with the winze (which is 3 fms. ahead of us), we shall have ground full in forebore in about another fathom driving. The said run (extending below the 90) is down 11 fms. 1 ft., and we have about 3 fms. to sink to be deep enough for the level; yielding good ore. The 90, and shaft, is worth for lead ore 35s. per cubic fathom. In the four stops, and in the several places where it is being stripped in the sides of this level, east and west of shaft, is worth on the average 20s. 6d. per cubic fathom for lead ore. The average width of the lode is 22 ft. The 90 east is driven by four men by the side of the lode. The 75 is extended west of shaft 152 fms. At the present end we are crossing north, and a lode in the end discovered nice ore ground, worth, so far as seen, about 10s. per cubic fathom. The winze sinking below this level, at a point 90 fathoms east of shaft, is down 22 ft. The stopes in back of this level, nine in number, are on the average 20s. per cubic fathom; mean width, 18 ft. 6 in. The 75 fm. set of shaft, is pushed forward by four men, by the side of the lode. The run of the lode to the footwall at the points in the side of this level are 100 fms. 2 ft., and 162 fms. respectively. East and west of shaft, is driving by the side of the lode. The stopes in back of this level, ten in number, are worth on an average 19s. per cubic fathom; average width of lode, 16 ft. The stopes in the back of the 45, four in number, are worth 12s. per cubic fathom; average width, 15 ft. The permanent winze driving as usual.—Surface: We are making good progress towards the completion of the lode-furnace. We shall start more of the machinery next week. The furnace takes place to-morrow upon 550 tons of lead and 350 tons of coke, of which 20 tons of coke and 200 tons of blende are the produce of the Van Mines.—WM. WILLIAMS.

GENERATION OF STEAM—DRY BOILERS.

This fact well known among engineers that in practice 5 per cent. of the heat of the coal, or about 1-20th part, of the heat that coal can produce, according to theoretical calculations, is actually transformed into motive power, and that consequently 19 kilos. of coal out of every 20 are employed. It may with certainty be stated that the theoretical efficiency of coal will never be practically realised, but the numerous attempts that have been made in this direction, and partly with success, show that a diminution of this enormous loss of heat is conceivable, and remains to be realised. The object of the invention of Mr. T. R. RIETH, of Bonn, Rhenish Prussia, is to reduce to a minimum the most important cause of this loss of heat. This is due to the fact that the large amount of air which passes through the furnace, added to the products of combustion, leads away in a needless manner into the atmosphere a large quantity of heat. To give an idea of the enormity of this loss it is sufficient to state that in well constructed boilers of marine engines the temperature of the products of combustion arriving in the chimney is raised to 200° centigrade, and that it attains even 300° in some boilers. This temperature is sufficient to produce again at least the same quantity of steam at the same pressure as that of the steam already produced in the steam boiler, and that by employing it to vaporise a hydrocarbon, the point of ebullition of which is about 60°. Theoretically speaking, it may be admitted that the temperature of the products of combustion in the furnace thus employed to vaporise a hydrocarbon will be lowered to 100° of heat; there will, consequently, have been an absorption of heat of from 200° to 300°, which will have been employed to produce motive power. A diminution of any point of ebullition desired may be used. It will, however, be best to employ one whose point of ebullition is as low as possible, on account of condensation. To the objection of danger from fire, it is sufficient to state that nowadays boilers are made perfectly steam-tight, that steam coming out of a little opening would not take fire, because it would not directly touch the flames. In addition to this, in employing dry boilers, or boilers without liquid, the total quantity of hydrocarbon stored will be so small that there need be no dread of fire. Suppose, for example, the invention be applied to an ordinary steam-engine, with steam-boiler of any construction, Mr. Rieth adds a new part a second boiler, destined to vaporise the hydrocarbon liquid. This boiler, called "dry," is placed either behind the engine or behind the first boiler. The steam-pipe of the hydrocarbon vapour leads to a second motor machine, which in working puts into motion a feed-pump. The vapour coming from the cylinder of the second machine enters a condenser cooled from outside. The gases coming from the furnace after having left the steam-boiler do not enter immediately into the chimney as at present, but circulate round the outside of the second boiler. At the same time each lift of the piston of the feed-pump drives back into the boiler a certain quantity of hydrocarbon liquid. This quantity is measured exactly, so that after its vaporisation it is sufficient to produce the necessary pressure to displace the piston in the steam-cylinder. After the pressure of the steam-cylinder has reached the end of its course the communication with the condenser takes place by a valve. In this

manner a vacuum is produced, which in the return course of the piston produces the same effect as that in an ordinary condenser. At the same time the feed-pump takes at the proper time from the condenser the same quantity of hydrocarbon liquid, and drives it back into the dry boiler in such a manner that the vapour from this latter when the piston returns produces a motive force upon the other side of the piston. This action is repeated regularly, as in all ordinary condensers. To prevent the hydrocarbon vapour cooling too much in the cylinder or, on the contrary, augmenting its expansion, it is desirable to encase the steam-cylinder and the steam-pipe of the second machine. In this casing the steam from the first boiler is allowed to circulate. This last utilisation of steam presents a certain analogy to the proposition of Mr. Verdal, of Tremblay. The steam from the first machine having been used may also be led to a condenser after having served to maintain the cylinder and the steam pipes of the second machine warm, and, consequently, whenever possible it will be best to make the first machine serve as a condenser. If this does not do the steam may be added to the gases from the furnace to increase the draft after having served as before stated. With great care the point of ebullition of the hydrocarbon may be fixed once for all for each machine, as only a small quantity of hydrocarbon will be consumed in the boiler. It is claimed, moreover, that the boiler will not require repairing, because incrustation will be impossible, and because the back plate cannot be destroyed by fire.

For these reasons, in applying the invention to marine engines, additional hydrocarbon boilers can be placed in a separate place, and if once for all the fastenings have been carefully done the boiler may be left to itself. It need scarcely be stated that caoutchouc, or india rubber, must not be used for the joints, some fire-resisting material, such as asbestos, being necessary. It is claimed that the invention may be applied with advantage to all machines which have at their disposal sufficient water for condensing purposes, but it is especially applicable to marine engines of all kinds, because the advantage for them is double, seeing that the expense of firing is saved and much room is gained. The advantages which the invention is said to offer are very numerous, the most prominent of which appear to be that no extra expense for working is required, and that the boiler may be constructed having regard only to the pressure and to the greatest possible surface, and in accordance with the most complicated systems of boilers, with straight tubes or bent, which cannot be used for steam-boilers by reason of the difficulty of cleaning.

FERROUX'S ROCK DRILL AT THE ST. GOTHARD TUNNEL.

M. Ferroux's rock-drill, which has been in operation since 1873 at the works of the St. Gothard Tunnel, has recently been much simplified in the mechanism for the feed and the percussion. The piston of the percussion cylinder is formed conically at each face for the purpose of reversing it at the end of each stroke. When it arrives at the end of the stroke it strikes a small plug, which slides in a cylindrical opening, and presses it inwards. This movement is simultaneously communicated by a lever to the small supply piston at the upper end of the cylinder by which the compressed air is shut off, and the exhaust opened. The percussion piston is then promptly returned to the upper end of the cylinder, where it strikes the small supply piston, and opens it for a fresh supply of compressed air, when the percussion piston makes the next down stroke.

The rotation of the percussion piston and rod is effected by means of an inclined groove cut in the rod, in which a pall is engaged. The pall is one piece with a ratchet wheel, which turns freely with the pall as it is swayed by the groove in the descending piston-rod, but is prevented by a ratchet from returning. The pall being thus held stationary, the piston-rod necessarily sways to the pall in its turn, and makes a portion of a revolution, shifting the position of the jumper for each stroke. The weight of the new Ferroux drill is about 440 lbs. The calculated volume of air expended per stroke of the piston is 85 cubic inches.

—By D. K. C.: Annales industrielles, 1877.

—FROM JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

AUSTRALIA.—From Melbourne (Oct. 4) we learn that the value of the imports for 1876 amounts to 1,133,000, and that of the exports to 1,130,953, which is an excess of 45,007, over 1875. The export of gold amounted to 10,270 oz., and tin to 1616 tons. There is general prosperity in South Australia. A bonus of 10,000, has been offered for the discovery of a coal field.

DECORATION OF TIN-PLATES.—Hitherto tin-plate has been decorated by direct impression or printing, but by the invention of Messrs. NEUBURG and Co., of Vienna, similar results are obtained without direct impression in a totally different manner, and more advantageously. Amongst these advantages may be mentioned that the backs of plates decorated in this indirect manner remain perfectly smooth, whilst in the direct process the back of the plate is more or less raised by the indentations of the type. The outlines of decorations made by the present invention are also much clearer. In decorating tin-plate according to this invention sheets of paper are first coated with sizing, glue, gum, or starch, and the so prepared surface is then printed with any desired design, words, or letters in the ordinary manner, so that there will then be a layer of sizing, glue, gum, or starch between the printing ink or printing colours and the sheet of paper. The tin-plate to be decorated is carefully cleaned, then supplied with a very thin but equal coating of varnish and finally kept in a suitable oven or heating chamber until the varnish is half dry—that is, until the varnish when touched with the finger will just stick to it, but cannot be drawn into threads. The tin-plate so prepared is then laid in a press, the paper prepared as above is laid on the tin-plate, and both are then drawn through the press. After both have been passed two or three times through the press the paper is damped with a wet sponge, and finally carefully drawn off so as not to be spoiled, as it can be afterwards again sized, printed, and used as above. The printing-ink and colours will then remain on the tin-plate, which is then cleaned with a wet sponge to remove the sizing, glue, starch, or gum which has remained on it after drawing off the paper. The tin-plate is finally supplied with a coating of varnish. It is preferred to use for this purpose a varnish composed of a mixture of asphaltum dissolved in turpentine, of copal varnish, and of linseed oil varnish. The mixture is allowed to stand for one or two days, and can then be used, turpentine being added until sufficient fluidity is obtained. The tin-plates coated with this varnish have at first a white appearance, but when left in an oven for several hours at a temperature of from 40° to 45° centigrade they assume a golden or silvery lustre.

PUMPS.—The object of the invention of Mr. JOHN MOYSEY, of London-street, is to construct a simple and efficient hand pump to deliver a continuous stream of water, applicable especially as a garden pump or syringe, or as a house fire-engine for immediate use in case of fire. For this purpose the barrel of the pump is provided at its lower end with an inlet valve and suction pipe; at the opposite end of the barrel is a stuffing box through which passes a hollow cylindrical plunger. The outer end of the plunger is closed, whilst at the inner end of the plunger there is a valve opening inwards. Through the top of the plunger passes a pipe which descends nearly to the bottom of the plunger; it is open at its lower end, whilst at its upper end it has a branch delivery pipe passing from it, to which may be connected a short length of flexible pipe terminating in a rose, or jet, or spreader. To the top of the pipe is also connected a handle by which the plunger can be worked to and fro. When the plunger is raised water is drawn into the barrel through the suction valve. When the plunger is forced down the water in the barrel enters the plunger through the valve at its bottom and compresses the air in the upper part of the plunger, whilst some of the water is also expelled through the delivery pipe. When the plunger is again raised the valve at its bottom closes, and the water still contained in the plunger continues to be forced out through the outlet pipe by reason of the pressure upon it of the compressed air contained in the upper part of the plunger. The lower end of the barrel may

have a stirrup attached to it for the person using the pump to insert his foot into, whilst he works the plunger up and down with one hand by a handle, and at the same time holds the delivery jet with his other hand; or a lever may be used for working the plunger to and fro, whilst the barrel may be carried by a barrel or tank containing the water supply or otherwise.

COATING PLATES OF METAL.

It has been the practice heretofore after pickling and washing the sheets or plates of iron or other metal to be coated to immerse them in a warm pan of grease, technically called the cold pan, instead of which Messrs. CROWTHER and MORGAN, of Kidderminster, place the sheets or plates in a hot-air chamber for the purpose of absorbing or evolving all moisture or dampness that may be left on them before immersing them in a bath of chloride of zinc, from which they restore them to the hot-air chamber to take all moisture therefrom; they then either put the sheets or plates direct into the coating metal pot, with sufficient grease or flux upon its surface, or, as usually done, immerse them in the cold pan, and then put them into the coating metal pot.

The apparatus which they employ consists in a rectangular horizontally fixed pot, sufficiently long and deep to enable them to coat sheets or plates of any required length or width; the said pot in a transverse sectional form is broad at the top for receiving finishing rollers, with short lateral rollers to prevent lateral deflection of the long rollers which work below the upper surface of the pot, below which the pot narrows gradually down to one-half its depth, and then descends parallel to the bottom, leaving an opening at the end or side, whichever may be most convenient, to remove the excess of metal taken from the sheets or plates. On the front side of the pot near the top, and either inside or outside as most convenient, they apply a longitudinal shaft working in journals, and to this shaft external weighted levers are secured, which are connected with and give motion to internal guide levers, of which there may be any necessary number, the use of which is to form guides for receiving the sheet or plate in an edgewise position, and guiding it down to the bottom of the pot to rest in a cradle, when the outside balance weights will correct the position of the internal levers, causing them to bear against the top edge of the said sheet or plate so as to keep it in a vertical position, in which position it is raised by vertical rods or chains connected with the cradle at the bottom, which is suspended to two levers working on the axis or shaft first described; the said levers extend sufficiently over the pot that by means of a weight suspended thereon a counterpoise is created for elevating the sheet or plate to the bite of the longitudinal finishing rollers first referred to, from whence it is easily removed, the cradle being raised any additional height required by means of screws.

The motive-power of the finishing rollers is derived from compound right and left worm wheels with which the rollers are connected by short spindles or couplings. Suspended to the axis of each finishing roller is a pendent receiver that collects the surplus coating metal, which is removed from the surface of the sheet or plate under operation by the action of such roller, the coating metal by reason of its gravity falling from the surface of the roller into the receiver, which performs a double duty of catching the surplus metal from the sheet or plate and feeding the surface of the rollers. These receivers are constructed with hollow chambers at the bottom, through which hot-blast is driven in a highly rarefied condition to maintain the metal in a higher degree of heat than the surrounding flux or grease.

RAISING AND LOWERING WEIGHTS.—The apparatus invented by Mr. A. HARRISON, of Lincoln, consists of a frame between which are two chain or sprocket wheels, each in a piece, with worm-toothed wheels, which receive their motion from a central worm or endless screw formed upon a shaft receiving its rotation to the right or to the left by bevil gearing and hand chain wheel from outside the frame. The lift chain is a single chain, and one end which is loose, is allowed to run freely over either of the lift chain wheels, the lift chain getting its grip for lifting purposes by the bite between the wheels by the links taking partly into each of them. The chain runs up between the two wheels and has its load attached to a hook at its bottom end. The two chains lift wheels are of the same diameter, and their centres are truly horizontal one with the other, at equal distances from the vertical centre of the worm axis or shaft so that they travel at the same speed and lift the chain between them. The shaft of the worm is stepped at the lower part into a portion of the frame, and its upper part is within an eye or boss of the same casting, which as part of the frame is securely held to the other at its upper part by bolts at the socket of the suspension hook, and at the bottom by the axle bolts which carry the lift chain wheels. The hand wheel on the outside is also a sprocket wheel for an endless chain to pass over, and by which the apparatus can be worked when suspended by its hook to the projecting end of a crane, jib, or otherwise. A stoppage of the motion of the apparatus enables the load to be suspended, and a reverse motion of the hand wheel permits it to be lowered.

PUMPS.—With a view to obviate all liability of the the valves of the pump being obstructed during frosty weather by the freezing of an accumulation of water collected above them, thus preventing the bursting of the barrel of the pump and suction pipe in frosty weather, Messrs. BELL and BLAGBURN, of Newcastle-on-Tyne, have invented some important improvements. They form on the suction valve a stem or neck extending upwards therefrom, and provided with a flange on its extremity, which stem or neck is embraced immediately beneath the flange by the arms of a bifurcated tumbler or locking lever mounted on a centre or fulcrum in a guard piece fitting the barrel of the pump. The guard piece is made of such a form as to control the lift of the valve, and also act as a guide for the stem in its motion, and the tumbler or locking lever is provided with a projection of such a shape that when the bucket is lowered by the act of raising the handle of the pump, which is connected to it to its full height, when the pump is at rest the bottom of the bucket will come in contact with the projection of the tumbler or locking lever and depress it, thereby elevating the arms, and consequently the suction valve, by their acting upon the flange of the stem, and allowing of the escape of any water which may have remained above the suction valve, any water which may have collected above the valve of the bucket being discharged simultaneously, or nearly so, by the lifting of the bucket valve, by its bottom being brought into contact with the flange of the stem of the suction valve during the same downward movement of the bucket, or upward movement of the suction valve.

LEAD ORES.				
Date.	Mines.	Tons.	Price per ton.	Purchasers.
Nov. 13—Wye Valley	350	£12 2 6	George Burr.
— ditto	250	12 11 6	Walker, Parker, and Co.
— ditto	50	12 11 6	Adam Eytan.
— ditto	50	12 8 6	Weston, Son, and Co.
— ditto	50	12 12 6	St. Helen's Smelting Co.
— ditto	50	12 9 6	ditto
— ditto	50	13 7 6	Walker, Parker, and Co.
— ditto	50	13 6 0	ditto

BLENDE.				
Date.	Mines.	Tons.	Price per ton.	Purchasers.
Nov. 15—Van	75	£2 16 6	Dillwyn and Co.
— ditto	75	2 10 0	Richardson and Co.
— ditto	200	2 12 6	Dillwyn and Co.
— West Tankerville	20	5 11 0	ditto

EAST BASSET.—A sale under the direction of the Stannary Court was held on Monday, when there was a very fair attendance of purchasers, and the prices realised were quite up to the average of recent sales. The engines were not sold, but the whole of the pitwork and many other articles were disposed of.

FALLING OFF OF STRAITS TIN.—A gentleman has lately returned to Camborne, from Southern India, who has spent a considerable time in the districts of Banca and the Straits. Concerning an evening or so since with some of his old acquaintances, he stated from his own observations that the tin supplies from that quarter have fallen and will continue to fall off. All the alluvial tin deposits are all but exhausted, there being at present no other alternative but to sink in the hard rock with the erection of costly machinery, &c., which must necessarily be required. Considering as well the present low prices he was certain that the diminution in a very short time will be greater.—West Briton.

wide, and worth 15s. per fathom. The lode in the slope in the back of the 120 is worth 12s. per fathom. The 120 is poor. The two slopes in the back of the 108 are worth 8s. per fathom each. There is no change in the 72 east. In the 48 east we have cut through the lode, which is 6 ft. wide. At the point where cut through a sparry branch crossed the lode, and in the west side of the branch the lode will yield 2 tons of ore per fathom, but the east side is poor.

WHEAL NEWTON.—Wm. Bennett, Nov. 13: No. 3 slope, in the back of the 40, east of Cook's shaft, is looking well, yielding very rich silver ore. All other points of operation continue much of the same appearance as when last reported on. We have commenced to haul the water from Hampton's shaft, having completed the horse wheel, and shall soon be enabled to resume sinking. Next Saturday being our setting day a full report shall follow.

WHEAL UNY.—Wm. Rich, M. Rogers, J. Rich, Nov. 12: We are sinking by the side of the lode in Hind's engine-shaft, and shall take it down in the course of a week or two. The rise in the 180 east carries stones of tin. The 150 east yields worth 12s. per fathom. The 150 west is worth 9s. per fathom. The lode in the bottom of the 130 west is worth 10s. per fathom. The 130 east is worth 8s. per fathom. The lode in the back of the 60 west is worth 7s. per fathom.

TO THE METAL TRADE.

FOR COPPER, TIN, LEAD, &c., apply to—
MESSRS. PELL, BOYLE, AND CO.,
SWORN METAL BROKERS,
ALLHALLS CHAMBERS, LOMBARD STREET, LONDON.
(ESTABLISHED 1849.)

The Mining Market: Prices of Metals, Ores, &c.

METAL MARKET—LONDON, Nov. 16, 1877.

IRON.	£ s. d.	£ s. d.	TIN.	£ s. d.	£ s. d.
Fig. GMB, f.o.b., Clyde.	2 12 0	—	English, ingot, f.o.b.	75 0 0	—
" Scotch, all No. 1.	2 14 0	3 10 0	" bars	75 0 0	—
" Walsley, f.o.b., Wales	5 8 0	6 10 0	" refined	77 0 0	—
" in London	5 17 8	6 0 0	Australian	67 10 0	—
" in Tyne or Tynes	5 10 0	5 15 0	Brazil	71 0 0	—
" Swedish, London	2 8 0	2 12 0	Straits	68 0 0	—
Rails, Welsh, at works	5 0 0	5 2 6			
Railway chairs	—	—			
" spikes	—	—			
Sheets, Staff., in London	8 15 0	9 0 0			
Plates, ship., in London	7 0 0	7 5 0			
Hoops, Staff., in London	7 10 0	8 0 0			
Nail rods, Staff., in Lon.	7 0 0	—			
STEEL.					
English, spring	16 0 0	20 0 0			
" cast	35 0 0	45 0 0			
Swedish, keg	16 0 0	—			
" lag. ham.	17 0 0	—			
LEAD.					
English, pig, common	19 15 0	—			
" " L.B. nom. 20	0 0	—			
" " W.B. 20	10 0	—			
" sheet and bar	21 0 0	—			
" pipe	21 10 0	—			
" red	22 8 0	22 10 0			
" white	27 0 0	28 0 0			
" patent shot	27 10 0	—			
Spanish	19 10 0	—			
QUICKSILVER.					
Flasks of 7 lbs., ware	7 7 6	—			
SPELTEN.					
Silesian or Rhinish	19 5 0	19 7 6			
English, Swansea	21 5 0	21 7 6			
Sheet zinc	22 10 0	24 0 0			
At the works, to be sold, per box less for ordinary; 10s. per ton less for Canada; 12s. per box more for 10c. quoted above, and add 5s. for each X. Terms—plates 2s. per box below tin-plates of similar brands.					

REMARKS.—We have lately heard from the highest authority in the land that our Government has "both hope and patience" in the blessings of peace, and that "the time may not be distant which will bring an issue" to the war now raging in the eastern part of Europe, and not only "restoring peace to Turkey but establishing her independence." These happy expressions will not only convey the greatest amount of joy and satisfaction to all classes of Englishmen, but will be sure to be heartily joined in by our fellow Indian subjects, our Australian brethren, our American cousins, our continental neighbours, and every inhabitant of the civilised world, but more particularly that section whose interests and welfare are so materially affected by the universal maintenance of peace and good order. What a happy Christmas indeed would it be to us all if we should be blessed with the blessings of peace! When such a declaration as we have quoted above emanates from one whose high position necessarily enables him to form an undoubted opinion of the probable course of foreign affairs we ought to accept it and act upon it, for although some among us may have thought differently, yet we must credit Lord Beaconsfield with being better informed upon the subject than it is possible for anyone else to be, as he, doubtless, possesses the fullest and best information of the disposition and character of all the powers, and if our rulers have and publicly state so, it is a confirmation that there are good grounds for its existence and adoption, otherwise it certainly would not have been mentioned at Guildhall, for no object could be gained in misleading the nation by a wilful misrepresentation; therefore, if hope is "entertained by Her Majesty's Ministers, surely a hopeful feeling should begin to spread amongst the people, and since the Prime Minister of England has been graciously pleased to enlighten and encourage us to hope it is quite time that we dismissed our fears, and began to look forward to more prosperous days, although we are encouraged to hope yet we are not to be over-anguine or impatient. The head of the Government was guarded in this expression of hope, and combined it with patience. Hope and patience he linked together, and thus only must they be taken—that is, hope may now be safely indulged in, but patience must be exercised.

The Eastern Question will not be settled by the sword—a Congress will have to decide upon the final terms of settlement, and the near approach of winter offers a fitting opportunity for entering into an armistice. It might be in hopeful expectation of such an event that the Premier observed that "the time may not be distant which will bring an issue" to the war that has been in progress, and prosperity to the people of Russia and Turkey. It is also satisfactory to learn that the balance of power in Europe is not likely to be disturbed, for we have the assurance of the first Minister of the Crown to this effect, for he says not only "restoring peace to Turkey, but establishing her independence," and this determination will not only preserve the balance of power, but also preserve our good relation with Russia; therefore, it will be in the interest of Russia to make peace at once and save herself from further degradation and prostration. In commenting upon the address of Lord Beaconsfield, we are bound to accept it as a frank, honest, and truthful statement of the situation of affairs, and to the benefit in a speedy proclamation of peace. We cannot of course claim infallibility for the first Minister of the Crown, although we think he is as clearly entitled to it in secular matters as the Pope of Rome professes to hold over spiritual affairs, but we may truly place implicit faith and confidence in his word, notwithstanding the different impressions formed on the Continent, and as a specimen of the contrary opinion expressed by the Berlin papers and some other papers we give the following extract from *The Nord*, which thinks that the speech is calculated to encourage Turkey to fight to the last extremity; here, then, we have quite the opposite view, and everyone must judge for himself as to the value of the correctness of Lord Beaconsfield's views, and as to the probability of a prolonged war or a speedy peace.

The conclusion of the war cannot be expected to remove every obstacle in the way of business, but it would be the greatest evil overcome, and as soon as ever it is stopped the course of our markets would be reversed, and, instead of going backwards, as they have been for the last year or two, they would turn round and go forward. Our markets would soon throw off their depression, gain buoyancy, and prices would no longer assume a declining tendency, but an upward tendency. But we have not yet arrived at that happy period; nevertheless, we are encouraged to have hope and patience, and those who follow this good advice will, doubtless, meet with their due reward. The unsettled state of political affairs in France may give cause for apprehension, and retard any general improvement, but, as matters stand at present, that is only of secondary importance, and we must not overlook the fact that no general improvement as yet has been made in anticipation of peace, and as the prices of metals for the most part are comparatively low, and do not form any hindrance to ordinary consumption, there is every incentive and prospect of an enormous expansion of trade; and, independent of our regular markets, there would seem to be, according to Mr. Stanley's report, an ample field for the enterprising merchant in the vast regions of Central Africa; in fact, another new world of commerce awaits us, and those merchants who find the competition and difficulties of the old markets more than they can encounter had better proceed forthwith and establish themselves in this newly-discovered quarter of the globe. Gold and copper are irresistible temptations—they have been the making of Australia and many other countries, and their magnetic influence will, doubtless, attract many an adventurer in a short time to Katanga. Pioneering, however, is a laborious task to perform, but by energy and perseverance, industry and honesty, all obstacles may be surmounted in an incredible short space of time, and those who get out first stand the best chance of amassing a colossal fortune.

We hope no vexatious opposition will be offered by any Government to the formation of settlements, and to the immediate opening up of trade with Central Africa, but that all claims and disputes will be amicably arranged by arbitration to the satisfaction of all parties. The complaints so often heard that the markets are overdone cannot apply to this recently explored district, for there everything is in a primitive state, and waiting to be turned to good account; it is not like an uninhabited wild, where it would take years to raise a population, but it is literally teeming with human beings, occupying towns and villages, and who only want to be instructed and brought to understand the advantages of commerce; and if the natives are kindly and honourably treated and dealt with there is no question but what it will lead to an immense outlet for all our manufactures. We need not despair of trade again reaching its former proportions while these fresh and vast regions remain to be explored and developed. Why, then, should there be any delay in organising trading companies for Central Africa? There are plenty of young and ardent spirits capable of managing such enterprises, and who would be only too glad of the opportunity. A fair amount of business has been transacted in metals this week, but mostly on earlier terms, the prices of

copper, tin, and lead being all slightly lower. The reduced prices in a little time cannot fail to stimulate consumption, and buyers must be on the alert in not missing a good chance when it presents itself. As there is a good deal of back work to make up, and times are sufficiently propitious to make a forward movement, the present quotations are tolerably safe, and although the markets may not be ripe for a grand speculation, yet we are of opinion that whatever may be sold should be quickly replaced, and consumers should on no account be dilatory in securing present requirements and booking a little forward.

COPPER.—Last week we proclaimed the triumph of Burra in the recent sales of Australian copper, but in doing so we did not accord a full measure of praise to it, and even now our space will not admit of our expatiating upon it in adequate terms or nearly so fully as it deserves to be recorded. In our last review we pointed out that between the highest and the lowest prices at the sale of Burra and Wallaroo the difference did exceed 5s. per ton, and it remains for us to state that with regard to the ingots it was only 2s. 6d. per ton, whereas the difference at the sale in July last was as much as 2s. 6d., and between the highest price of Wallaroo ingots and the lowest price of Burra ingots there was 4s. per ton; therefore, the conclusion that was reached in our last review, that the market was overdone, has been depreciated in the estimation of buyers to the extent of about 2s. to 4s., or that Burra has improved to that same extent; but whichever way it is looked at the result is particularly favourable to Burra, and a complete triumph for this celebrated brand. Burra may now be considered quite on a par with Wallaroo, and we should not be surprised at some future time to find it once again preferred and esteemed above the value of Wallaroo. The price realised at the sale for Burra was undoubtedly satisfactory to the Australian Company, but the sale in other respects must have exceeded their most sanguine expectations, for while Burra was completed for and went off in the most lively and spirited manner, Wallaroo rather lagged, but the crowning success of all for Burra turned upon the character of the buyers, for there was so much more copper bought in the name of consumers this time than in July last, which goes to show how highly the best judges of quality appreciate the Burra brand.

It is, perhaps, unnecessary to state here the reasons why the difference in price between Wallaroo and Burra was ever more than about what it is now; suffice it to say that the intrinsic value of Burra has not deviated from its original standard, and that it is as celebrated as it ever was for purity and excellence. Should there be any consumers who have not yet used it, we can safely recommend them to do so, for "it needs only to be tried to be approved." It is a good sign to see consumers coming forward and buying so freely, for it looks as if their requirements were increasing, or that they think present prices sufficiently low to render it safe to buy in anticipation of a renewed demand, and many think it rather an oversight on the part of dealers in allowing so much copper to slip through their hands at these exceptionally low rates. The price of Chili bars has now reached what it may go lower, but buyers need not be apprehensive of any serious drop. The decline has been delayed longer than it ought to have been, and the market has consequently become languid, and the inducements for business are somewhat abated, but this is merely a temporary subsidence, and if Russia and France would only study the happiness and welfare of their respective populations, and those of European nations promote peace and good order, we should very soon experience a change for the better. We want to see a greater interest taken in our markets by all who are in any way connected with them, and this seems a very favourable opportunity. We hope there will not be much delay in commencing to get in stock, for there is always a certain security in making investments in staple commodities below the average of years, and the present price of copper is so far favourable that it commends itself to the consideration of buyers. The deliveries are large, and the stock during the last fortnight has been sensibly diminished; statistics are, therefore, improving, and that is one step in the right direction, but sellers must be careful not to refuse good offers when they are made, otherwise buyers will hold back, and the whole improvement will be jeopardised. Importers should not be deterred in any way by the low price of copper, well stocked. The reason that prices are so low is partly owing to the retention of stocks in the first hand, and we have urged importers over and over again to realise a portion of their stocks, for we could clearly see while they retained possession of large quantities the whole trade would be against them; in fact they have brought the market down upon their own heads by persistently adhering to their own course in opposition to the necessities of the times and the demands of the people.

IRON.—There has been a fair amount of orders placed for bridge work this week, but the demand is not so active as to enable makers to obtain better prices. Merchant orders for bars have not been quite so numerous, nevertheless quotations remain unaltered. There is no doubt, however, that in most branches of the iron trade a slight improvement in the demand is observable, but higher prices cannot be obtained; at present the markets are not sufficiently animated to warrant such trifling fluctuations. Sellers must be content for a time to execute orders for small profits, or, if needs be, to do so without profit; and it may be advisable in some instances even to carry on at a positive loss, although in this last case there ought to be the greatest amount of assurance that it can be recovered hereafter; but we are in a prostrate condition at present, and it is better to admit it and face it than to try and cover it under false colours. Many of our works are completely on their beam ends, but only shy hard to break up establishments and homes, and for practicing economy and retrenchment in every possible way. Our rapid clearance of stocks did all the mischief, and now we have to smart and to pay dearly for our former excesses. We must repair the damage as well as we can, and reconstruct with renewed energy and perseverance to recover the lost trade. The old system of extravagance and prodigality requires to be swept right away, and everyone must be made to forget the ease and affluence which an inflated period led into, and utterly corrupted our good morals. Masters must no longer think of making handsome profits, and men must be content to work for considerably less wages; it is very hard to break up establishments and homes, and to have to begin the world afresh—nevertheless, necessity compels, and what cannot be cured must be endured. Man will soon accommodate himself to circumstances if he has the will and disposition. The greatest difficulty is always in the beginning, but when once the first step is taken, and a strenuous effort put forth, the trouble and inconvenience soon vanish.

The altered state of trade, and the altered state of affairs throughout the whole country will prove to men that they can no longer dictate what terms of employment they please to their fellow-creatures; first of all, because people are not possessed of such good incomes as formerly, and consequently, have not the power of paying so liberally, however much they might be disposed; and, secondly, on account of there being less work to execute, and an increasing competition amongst the labouring classes. Higher wages will not be procurable for a considerable time, and as reduced expenditure must be effected, it would be much better to try and improve our condition by the strictest economy and self-denial than to be ever agitating for higher wages and shorter hours. If we expect to be benefited we must first of all benefit others, and leave nothing undone to improve and advance the interest of our employees. Most of us, unfortunately, are too selfish, and overlook the injury we are doing ourselves by not making the interests of others identical with our own. Take the working classes, for instance, in a factory, how many are there who ever show a disposition to work beyond their hours, however pressed the masters may be for the execution of the work. They will not stay five minutes after the bell has rung, or come five minutes before. There is evidently no respect for feeling, and the consequence is the men do as little as possible, and that little is done very indifferently. With such behaviour it is surprising that the trade can be kept together at all. The men should work better and longer if they wish to earn more wages, and improve their condition; but the faithful services of servants go unrewarded; their character ensures them constant employment and the highest remuneration. We trust that the days of Unions are numbered, and clubs and societies formed for the purpose of creating enmity between employers and employees, for they are a curse to the country. Let us substitute the spirit and bond of unity between masters and men, and let that be the only union in existence. Grievances and complaints are far more likely to be redressed where a good understanding is cultivated than by the adoption of any direct and antagonistic measures. Equity and justice should be the working principle, and all oppression and coercion suppressed. The Scotch pig market this week has been easier, and prices leave off at 52s. m.n. cash.

Week ending Nov. 11, 1877	Tons	10,715
Week ending Nov. 10, 1877	Tons	8,523
Decrease		2,192
Total decrease for 1877		11,945
Imports of Metalliferous pig-iron into Grangemouth:—		
Week ending Nov. 10, 1877	Tons	7,920
Week ending Nov. 11, 1877	Tons	4,420
Increase		3,500
Total increase for 1877		66,579

FURNACES.
In blast Nov. 11, 1877. 117
In blast Nov. 10, 1877. 88

TIN.—Our market has lost its buoyancy, and is sinking again. Speculators who were so confident of the upward tendency have lacked courage to follow up the advantages which, according to their accounts, were so certain to be realised, and which they wished to impress so strongly upon others; but, strange to say, that so soon as they cease to operate a panic ensues, and buyers begin to think whether the market after all has not gone a little too far and a little too fast. Some holders evidently think so, and have already accepted 67s. 10s., or 2s. under last week's quotation for Straits and Australian, but if there was any justification before for prices to advance to 70s. and 71s., as reported about ten days ago, how is it without any fresh feature the market should suddenly drop to 67s. 10s.? If the market had been advanced solely upon legitimate buying there would be no occasion for the reaction, and prices ought to be as firm now as they were 10 or 12 days ago, but, of course, if speculation forms a price then the matter is easily explained, and we are not surprised to find the tin must be sold or advanced upon, and the latter course is not always convenient or advisable, and it is not likely that dealers are going to take back the tin from speculators at the full advance, and burden themselves with unsaleable stock. Speculators have a dread of being hung up with a stock of tin, and no wonder at it, considering the frightful losses that had been incurred, which may yet follow, but there are some holders so infatuated with the metal, or rather caught with it, at prices so considerably above its value that sooner than part with it they prefer to let it rest where it is, and eat its head off, but since the discoveries in Australia and Tasmania for anyone to hold for bygone prices, such as 150s. per ton, would be a confirmed lunatic. But it is extraordinary how much of this kind of insanity at times prevails amongst commercial men; they think because an article costs them a certain price some fool will be found to pay them a dearer one, and when they find out that people are not such fools as they took them for they feel chagrined, and in a fit of desperation resolve to act the part of "dog in the manger;" but, seriously speaking, trading upon fixed principles, and laying out a course for oneself is quite impossible; the day has gone by for that sort of thing, and unless people are prepared to buy and sell on the basis of the market, and to be guided by a proper manner, a man may speculate or deal to any extent he pleases, and the larger his operations the more valuable his connection; but then he must not attempt to monopolise or lock up a stock to the injury of legitimate trade. He

must be always ready to take a profit or submit to a loss as the case may be, and we should like to see this class of dealers on the increase, for they are a useful body of men, and help to make a market.

Another Banca sale is announced for the end of this month. Whatever the future of our market may be, it is not expected to improve until after that is over, although this description of tin has become obsolete here, as it generally is elsewhere, in price, but no better, if so good, in quality as Tasmanian. The deliveries for the first fortnight in the month are reported as satisfactory, therefore if speculation will kindly come to the front again, and they are sure not going to be frightened off yet awhile, for that would be terribly disappointing to many who have relied on their wake, prices will again rally, and we shall go on as gaily and as hilariously as before. There are some quiet going folks who are rather averse to speculation, but their prejudices are rarely considered or listened to; besides, the speculation would never have been effected if speculation had not been at the bottom of it and decided the movement. As to the maintenance of the rise, that is quite another matter. Speculators only intend it to last as long as it suits their purpose, and if bona fide buyers have unfortunately had to pay 70s. and 71s., and the price is now 68s., that is merely the natural result of buying in a speculative market and giving untimely support to fictitious prices.

LEAD.—The market has been quiet, and prices have declined about 3s. per ton for English pig. By the mail from New York on Nov. 10, the price of 3rd inst. we learn that foreign pig is neglected, and prices remain entirely nominal. The demand for domestic light. Sales at 75 to 100 tons common at 4½ c. to 4¾ c., holders quoting 5 c. The total imports were 239,736 pigs, against 124,486 pigs in 1876.

TIN-PLATES.—In fair demand, but prices are unimproved. **QUICKSILVER.**—On Tuesday, Wednesday, and Thursday the tin-plate would not sell at all, and refused to name a price. On both Monday and Friday they accepted 7½ s. for small quantities, but as they refused to satisfy the requirements of the market, second-hand parcels have fetched 7½ s. 6d. There is no change whatever in California.

The settlement of the fortnightly account has occupied the chief attention of the dealers in the MINING SHARE MARKET this week, and the fresh business transacted has been of moderate amount.

The mines chiefly dealt in have been South Cornduw, Fatsley Bridge, West Pateley, D'Essey Mountain, Rookhope, Glenroy, South Frances, East Van, Leadhills, Parys Mountain, West Wye Valley, Prince of Wales, and a few others.

TIN MINES have been weaker since our last, and prices generally are not so good or so firm as they left off last week. No further official change has taken place in the standard that we have heard of since the 5th, but the tin trade is reported as a little flatter, and the smelters are buying at a reduction. Carn Brea has declined to 47 to 49; Dolcoath, 35 to 37½; Tincroft, 16 to 17; South Cornduw, 8½ to 9½; South Frances, 3½ to 4; Cook's Kitchen, 2½ to 3; East Lovell, 20s. to 30s.; Penstruthal, 5s. to 7s.

South Crofty, 10 to 12, call paid; at the meeting the accounts showed a loss on the quarter of 955s., and a balance against the mine of 1917s. The copper ore realised 937s.; tin ore, 1398s. A call of 1s. per share was made. The costs for the next quarter will be less, and as tin is improving it is hoped the position of the mine will be better at the next meeting. The Lovell, 2½ to 3½; the lode in Hownan shaft sinking below the 31 is still 12 ft. wide, and worth 22s. per fathom for the length of shaft. Lode in slope in back of the 30 is 8 ft. wide, worth 15s. per fathom. Slope in bottom of the 30, 10s. per fathom. West Goldolphin, 2 to 2½; Wheel Agar, 3½ to 4½; Wheel Basset, 15 to 17½; Wheel Grenville, 3 to 3½; Wheel Jane, 2 to 2½; Wheel Kitty, 2½ to 2¾; Wheel Peavor, 5½ to 6½; Wheel Uny, 1½ to 1¾; West Basset, 2 to 2½; West Frances, 5 to 5½.

COPPER MINES continue low and depressed, but it is just possible copper may have an advance ere long, and low priced shares become in demand. Devon Great Consols, 2½ to 3. West Tolgu, 3s. to 7s. Parys Mountain in request at 11s. to 13s.; the prospect at the 90 shaft are still described as very encouraging. Morfa, 7s. 6d. to 10s. Marke Valley, 15s. to 20s. Prince of Wales, 5s. to 7s. South Caradon, 80 to 90. Wheel Crebri, 3 to 4. Tolgu, 5 to 6; a discovery of copper has been made in the mine sinking below the 25. **LEAD MINES** have been moderately active and in some mines at an advance. Van are 31 to 33; the sale of lead ore this month (550 tons) realised 6932s. 10s.; 350 tons of blends, 946s. 17s. 6d.—total, 7929s. 7s. 6d., or 1051½ s. more than the last month's sale. Herodsford, 6½ to 7½; at the meeting in Cornwall the accounts showed a profit for four months of 37s., and a balance of assets over liabilities of 135s.—the lead ore sold realised 193s.

Roman Graves. 7½ to 8; the sampling is 180 tons of lead. The 106, north of winze, north of flat-rod shaft, is in a lode worth 14s. per fathom; the 106 south is worth 3 tons. Pateley Bridge, 1½ to 4; the Rake vein, in the 30 east, has improved to 7 tons of lead ore per fathom. The agent estimates his reserves in the mine at over 500 tons, and trusts that his expectations of speedily making good profits may soon be realised. South Roman Graves, 3½ to 4; the lode in the 45 east has yielded some fine stones of lead and blends. West Pateley, 1½ to 2½; the agent writes that the 30, east and west, on Golden Fleece vein, has much improved during the week. West Tankerville, 15s. to 17s. 6d.; the 20 tons of blends realised 71s. 10s. Aberdaunt, 6s. to 8s.; Court Grange, 1 to 1½; East Van, 3 to 3½; Glenroy, 15s. to 20s.; Great Laxey, 2½ to 3½; Ladywell, 17s. 6d. to 22s. 6d.; Leadhills, 4½ to 5½; Leadwrt, 2 to 3; North Laxey, 9s. to 11s.; Pandora, 15s. to 20s.; Bodrius, 1 to 1½; Rookhope, 21s. to 23s.; Van Consols, 7s. 6d. to 12s. 6d.; West Chiverton, 13½ to 14½; Gorseid and Merlyn, 5 to 6; Great Holway, 5 to 5½; Pennant, 4½ to 5; Caron, 2 to 2½; Grogwinion, 3½ to 4; Red Rock, 1½ to 2½; South Cwmystwith, 3½ to 4½; St. Haroon, 2 to 3; Wye Valley, 2½ to 3; West Wye Valley, 3½ to 4.

FOREIGN MINES.—Argentina, 2½ to 3; Blue Tent, 3 to 3½; Condes, 2½ to 3; Huitafal, 5½ to 6; Chontales, 2 to 3; Eberhard and Aurora, 7 to 7½; Flagstaff, 2½ to 2¾; Frontino and Bilia, 3 to 3½; I.X.L., 5s. to 7s.; Javali, 6s. to 8s.; New Zealand Kopang, 1½ to 1¾; Malpaso, 2 to 3; New Quebrada, 2 to 2½; Port Palfrey, 10s. to 12s.; Richmond, 8½ to 8¾.

The Market for Mine Shares on the Stock Exchange has shown considerably less animation than last week, the general settlement having shown stock to have been more abundant than was anticipated, and a depressing effect with regard to every class of security being the result. In the shares of home mines there has been a decided decline, the difference in quotations showing in all a decline of about 10 per cent.; thus, Carn Brea have receded 4s., Tincroft and West Tolgu each 1s., and most others are also quoted less than a week. In connection with foreign shares the decline has been less general, although the assertions as to improvements in some of the mines have not been substantiated. Flagstaff shares have been somewhat higher, but there is said to have been considerable internal dissension at the board, one director getting private advice by one means, and another by other means, as to the indications at the mines, and there can be no doubt that although Carn Brea has probably used his information in such a way as in his own opinion was most conducive to the interest of the general body of shareholders, the creation of the opinion among the outside public that all is not "fair and above board" cannot tend to the permanent advantage of a company, although it may enable a few to let their shares slide at an advance.

The reported great improvement at Eberhard and Aurora, noticed in the Journal a fortnight since, had to be contradicted last week, and the reality of the reported improvement at Flagstaff now appears to be equally open to question. Rumours as to information having reached the board instead of an individual company, owing to the company's cypher having been accidentally used, may well be accepted for what they are worth, as it would be unjust, except upon very conclusive evidence, to charge any of the mines sufficiently high in office to be entrusted with the company's cypher, either with communicating with individuals, and by means of another cypher, or with using the company's cypher to send over false information. Any director who can be trusted to such an extent as to receive private information as to the working of any mine with which he is connected should be at once removed from the position of director or office bearer, and if he had any self-respect he would at once request or offer to resign, and relations near the company's property to forward all statements concerning such property to the company's office. The honesty of a director habitually in receipt of private information is very properly doubted, however little ground of doubt may exist.

With the new accession to the board it may be hoped that the unpleasant rumours which have been current will altogether cease. Cape Copper, 33 to 35; the last advices are favourable with regard to Ookiep. The stopes have yielded well during the month, and the works, both underground and at surface, have been carried on regularly. The prospects at Spektakel continue gloomy, and a few more months will exhaust the trials. At the trial mine, west of Ookiep, the level from the bottom of the shaft produced some very good copper ore, but the most productive ground is in the lower part of the driving, consequently they have decided to deepen the shaft. The returns were—from Ookiep 950 tons of 33 per cent., and from Spektakel 8 tons of 40 per cent.

St. John del Rey, 325 to 335; the telegram received on Tuesday states that the produce for the month of October was 35,000 oits., of the value of 13,562*l.*, and that the ley of the ore was 7.9 oits per ton. The September produce was 8.1 oits per ton. The advices received on Wednesday bring down the news from Morro Velho to Oct. 18. A large amount of work had been done during the month. The foundation of pumping-wheel had been permanently repaired; long sections on main water-course had been renewed, and other miscellaneous though pressing work done. The aggregate produce for September was 40,255 oits. of gold, from 4541 tons of mineral treated, being 4641 oits. of gold, or a fraction over 1 oz. per ton. The value of the gold was 15,482*l.*, and the cost 242*l.*, leaving a profit of 8060*l.* The exchange was the same as in the previous month, and the cost was less by 236*l.* Delays were still being experienced in the reduction department, the pinion of the Crossworth stamps having given way. At the Praia 12 additional loads had been put to work, and owing to the large reserve of general mineral, with kills, they will be kept apart for the treatment of the same. Heavy rains had set in, and the supply of water passing over the establishment was more than sufficient for all requirements. Don Pedro, 3 to 4; the telegram from Rio, on Monday, gives the produce for October at 4200 oits.

Chontales, 3 to 4; 1130 tons of ore were treated during September, producing 339 oits. gold, or an average of 6 dwts. per ton; the value of the gold 932*l.*, and total cost 466*l.*, leaving a profit of 466*l.* The above cost includes 72*l.* for machinery and tram-roads. The report is encouraging. Javali, 4 to 5; the manager reports that in 25 days 644 oits. of gold, of the value of 1690*l.*, were obtained from 2100 tons of quartz, whilst the expenditure was 906*l.*, including 70*l.* on capital account.

Richmond, 8 to 8½ ex div.; the usual weekly telegram from the mine at Eureka gives the week's run at \$75,000, from 1000 tons of ore, with three furnaces. The week's produce of the refinery was 3000*l.* Everything is running well. The manager reports that the 800 drift or quartzite is looking very promising; it shows occasional stones of iron ore. The 900 on fissure is without change. The furnaces are doing very well, and producing a large amount of bullion. The third stone furnace is now working on Jackson ore and dresses from calcining pans. The manager states that "The ore body in the 6th level, westerly from the shaft, is looking largely of very rich ore, and as it is broken out expands to large proportions, insuring supplies for the furnaces now in operation for an indefinite length of time. We are informed that the drift run on the 6th level, to tap the same ore body at a further depth of 100 ft. is in ore, and the average assays from that point are higher than above. Meeting the deposit at this point proves the permanence and extent of the ore body, and is evidence of its proportions. The company have closed a contract calling for 200,000 bushels of coal to be delivered after January 1, and from all their movements we deduce the fact that they anticipate, and are providing for an uninterrupted run of many months. The members of the English Commission have been busy during the week investigating the affairs of the company, their enquiries extending to all the ramifications and branches payable from the operations of so vast a concern. Their conclusions will be laid before the shareholders on their return to London, and they promise to furnish a most interesting document."

Flagstaff, 2½ to 3; further discoveries of rich ore are announced, and the company's status and affairs in London are considered to be brightening. Two new directors have taken seats at the board—Mr. John Garne, who, it is said, has promised financial assistance to the company, and Mr. John Wild, whose name is well known in connection with the Cape Copper Mining Company. The prospects of the concern are considered to be so good that energy and good management are alone necessary to make it a success.

The Mineral Hill advices state that work has been resumed under the direction of Capt. Plummer on the English company's mines, and that he has a force of men at work in that portion known as the Queen's Tunnel—an adit driven some 300 ft. formerly. Capt. Plummer is of the opinion that the work will result in the opening of a large body of ore, the indications being favourable at the present time. He has also renewed the policy formerly adopted, and has leased on shares a portion of the company's ground to the hardy miners who are active in the pursuit of hidden bonanzas. About 10 men are busy at work, and the Hill has assumed a cheerful and busy aspect. If Capt. Plummer be successful in his efforts, and developments justify the step, it is probable that the mill will soon resume operations. Exchequer, 4s. to 6s.; no official communication has yet been issued as to the company's affairs. I.X.L. 3s. to 5s.; the engine-shaft is down 32 ft. below the 300, and water is still rising. The shaft is looking favourable in the bottom, full of small streaks of quartz. Everything in and about the mine is running and working well.

Huitfall, 5½ to 6; the latest advices from the mines state that the buildings and foundations for the dressing-floors are all ready for the reception and erection of the machinery, that a large portion of the machinery had already arrived, and that every effort would be made to get the same into working order as quickly as possible. Large quantities of ore have already been raised ready for the completion of the machinery, and every part of the expeditious at the mines continued equal in value to when last reported.

Lead Mines have been in good demand, especially low priced descriptions, and it is said that in some cases buyers have found difficulty in obtaining shares at quotations. Van, 31 to 33; the monthly report states that the mine is looking well, as usual. The four weeks' sale on Thursday—550 tons of lead and 350 tons of blende—realised 7929*l.* 7s. 6d. This sale was augmented by the first produce of the new halvans dressing-floors, which produced 20 tons of lead and 200 tons of blende. Grogwinion, 3½ to 4; the manager announces an important improvement this week, the No. 4 lode having been cut rich in the 68 cross-cut, which had been driving for this point for some months past; the lode shows a satisfactory quantity of ore, fully equal to what was expected from it. The manager further states that there is also a good lode in the deep end (the deepest point in the mine) much better than they have ever had before. This news is considered the more satisfactory as it confirms the opinion expressed by the executive, that when the adit arrives for sinking the shaft below the deep adit the lode is likely to be found equally as productive as they have already proved in the upper levels, all of which are high and dry above the level of the River Yatwith. Wye Valley, 2½ to 3½; a parcel of 30 tons of lead was sold on Monday, at 12*l.* 2s. 6d. per ton. The sales of 1000 new shares, to provide funds to sink the new shaft and drive levels, has been well applied for by the shareholders. The latest news from the mine is satisfactory. West Wye Valley, 2½ to 3; cum div.; the meeting is to be held on Dec. 3. The report submitted is satisfactory, and shows that great progress has been made during the past year, and that regular sales of ore will be commenced at once. Caron, 2 to 2½; everything is reported to be going on well at the mine, and the appearance of the lode is very satisfactory. South Cwmystwith, 3½ to 4½; the annual meeting will be held early next month. The mine is still opening out, and ore is now being got ready for the crushing mill. Red Rock, 1½ to 2½; good progress is making in dressing ore for market. The cross-cut towards the lode in the 72 is being speedily pushed forward.

Pateley Bridge, 3½ to 4½; the 30 east on Rake vein is opening out on a magnificent course of lead ore. The vein is 8 ft. wide, and worth 100*l.* of lead ore per fathom. Fielding's vein, in the 20 end north, has also improved, now worth 1½ ton lead ore per fathom. Other parts of the mine unchanged. A telegram received yesterday (Friday) afternoon announces a further improvement in the Rake vein east; now contains 2 ft. solid lead, and worth 6 to 7 tons of lead ore per fathom. Leadhills, 5 to 5½; the monthly report states that the mines are looking well, and raising large quantities of lead ore monthly. The various ends are, it is said, nearly all approached, and the ground, so that some important discoveries are

likely soon to take place, which will, it is thought, tend to enhance the value of the property.

Subjoined are the closing quotations:—

Ashtone, 3½ to 4½; Carn Brea, 45 to 50; Devon Great Consols, 2½ to 3½; Dolcoath, 35 to 37; East Caradon, 1½ to 1¾; East Van, 3¼ to 3½; Glenroy, ¾ to 1; Glynn, ¾ to 1; Great Laxey, 2½ to 3; Hingston Down, ¾ to 1; Leadhills, 4½ to 5; Marke Valley, ¾ to 1; Parys Mountain, 1½ to 2; Pateley Bridge, 3½ to 4½; Penstruthal, 1½ to 2; Roman Gravel, 1½ to 2; Rookhope, 2s. 6d. to 2s. 8d.; Tankerville, 4½ to 5½; Tincroft, 15 to 17; Van, 31 to 33; West Ashtone, 1½ to 2; West Chilivert, 13 to 14; West Pateley, 1½ to 2½; West Tankerville, ¾ to 1; Wheal Crebor, 1½ to 1; Wheal Grenville, 3 to 3½; Almada and Tinto, 4 to 5; Argentine, 2 to 3; Birlsey Creek, ¾ to 1; Blue Tent, 3 to 3½; Cape Copper, 33 to 35; Cedar Creek, ¾ to 1; Chontales, ¾ to 1; Colorado Terrible, 1½ to 2; Condes of Chili, 2½ to 3; Don Pedro, ¾ to 1; Eberhardt, 4½ to 5; Exchequer, 4½ to 5; Exchequer, 4½ to 5; Emma, ¾ to 1; Flagstaff, 2½ to 3; Frontino and Bolivia, 2½ to 3½; Huitfall, 5½ to 6; I.X.L., 4s. to 6s.; Javali, 4 to 5; Kapanga, 1½ to 1¾; Last Chance, ¾ to 1; New Quebrada, 2½ to 3½; Pestarena, ¾ to 1; Plumas Eureka, 2½ to 3; Port Phillip, 7-16ths to 9-16ths; Richmond Consolidated, 8½ to 9½; St. John del Rey, 325 to 335; Sierra Buttes, 1½ to 1¾; South Aurora, ¾ to 1; Teocoma, ¾ to 1; United Mexican, 1½ to 2; Oregon pref., 4 to 4½.

COLLIERIES.—During the week now closing a slight amount of activity has been noticeable in the market for this class of shares, and this is to a large extent supported by the generally received fact that now, while trade is bad and prices at their lowest, is the best time to venture into colliery and iron companies of a bona fide class. The various coal markets, while not showing any great increase in price clearly indicates great firmness, which must result in higher rates before very long; and that this is generally appreciated by the "knowing ones" is evidenced by the fact that the greater number of enquiries after coal and iron shares emanates from persons either interested in or connected with the trade. Chapel House, Alltani, Newport Abercrom, and Thorp's Gawber all exhibit greater firmness. Chapel House new pit is down 330 yards, and will be completed to the Park Mine by January; everything else going well. The shares close at 3 to 3½; Alltani shares close at 4 to 5; the tunnel to the main coal at section D is within 8 yards of the seam, and good progress is being made. Llay Halls have been dealt in at 8 to 9; considerable improvement is noticeable in the output of this colliery, the amount of coal raised daily being rapidly increased. Benhar shares are at 1½ to 1¾; the 18-in. seam is now being worked, and the output has been done at slightly higher prices, the closing quotation being 1 to 1½. Consett iron shares close at 17½ to 17¾; Andrew Knowles and Son, 18½ to 19; New Sharstone (pref.), 3½ to 3¾; Fellsall Coal, 3 to 4; Thorp's Gawber Hall at 2½ to 2¾.

The report of the New Oriental Hotel Company for the year ending June 30 last shows a net profit of 1189*l.*, which with 651*l.* brought forward, is 1840*l.* available for distribution. The interim distribution in August absorbed 1690*l.*, and a further dividend of 4 per cent. which is recommended (making 8 per cent. for the year) leaves 490*l.* to be carried forward.

At the general meeting of the Ilfracombe Hotel Company, held to-day, a dividend of 5 per cent. was declared, and 300*l.* carried forward.

Mr. W. C. Cooper, of King's Arms-yard, has been appointed liquidator of the Government Security Fire Insurance Company.

THE IRON TRADE.—(Griffiths's Weekly Report).—Friday Evening. Business was done this morning on the Glasgow Exchange in G.M.B. pig iron at 52s. 11d. The price of warr. nts. this afternoon at the close was 52s., a fall in price since last Friday of 8d. per ton. We quote makers' No. 1 iron: Gartsherrie, 60s. 6d.; Coltness, 60s. 6d.; Calder, 61s.; Langdon, 6s. 6d.; Summerlee, 59s. 6d.; Monkland, 58s.; F.C.B. Glasgow, 57s. 6d.; Carnarvon, 58s. 6d.; Edlington, 57s. 6d.; L.O.B. Ardrossan, 57s. 6d.; Kewell, 57s. 6d.; Leith, 57s. 6d.; F.C.B. Bonmahon. There is very little change to report in the iron trade this week. The Glasgow market has given way a little for Scotch pigs. At Middlesbrough, on Tuesday, the market was weak and uncertain. Forge iron is perhaps a little weaker. On the West Coast hematties are firm. The produce of Frothingham, Derbyshire, Staffordshire, and Shropshire remains unchanged in price. This market price for all these brands remains unchanged, but we cannot report much business in either. The market for all kinds of cast iron is very quiet, and only a very moderate business can be reported. Sheet iron for galvanising purposes is more in demand than any other kind.

Messrs. HARRINGTON, HOBAN, and Co. (Liverpool).—Arrivals here during the fortnight of West Coast, S.A., produce:—Annie Storey, from Valparaiso, 50 tons bars; Deva, from Central, 60 tons bars; Camilla, from Valparaiso, 75 tons bars; and 150 tons ingots. At Swansea:—Camilla, from Pen and Colliery, 870 tons ore; Besse's, from Tocopilla, 790 tons ore and 139 tons regulus. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

Ores.	Regulus.	Bars.	Ingots.	Barilla.
Liverpool	1223	917	12,269
Swansea	2751	470	1,872
Total	3977	587	14,141

* * With this week's Journal a SUPPLEMENTAL SHEET is given, which contains: Original Correspondence—Manufacture of Iron and Steel; Instability of Nitroglycerine Compounds; Electric Lighting (A. Vassart); Colliery Accident Fund (A. Mansel); Meteorology; Pen and Colliery; 870 tons ore; Besse's, from Tocopilla, 790 tons ore and 139 tons regulus. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

Ores.	Regulus.	Bars.	Ingots.	Barilla.
Liverpool	1223	917	12,269
Swansea	2751	470	1,872
Total	3977	587	14,141

TOLGUS CONSOLS.—As expected, an important discovery has been made in the sump below the 25.

EAST LOVELL.—The cross-cut towards the north lode is in favourable ground, and the lode is expected to cut rich.

WEST PATELEY (Lead).—The vein (at the Golden Fleece section of the property) in the 20, from No. 2 shaft, has further improved, and continues to open out a rich lode, especially in the side of the levels. The Craven Cross vein, in the 56, improves as the end approaches the great deposit said to have gone down in the bottom of the old workings. At surface and underground vigorous operations are in progress opening out a mine of no ordinary magnitude.

PATELEY BRIDGE (Lead).—The telegram published in last week's Journal has since been confirmed by the official announcement that the Rake vein in the 30 east has further considerably improved, now worth from 6 to 7 tons of lead ore per fathom. The produce for October amounts to 28 tons of clean ore, worth over 400*l.*, at a monthly cost of 340*l.* The mine throughout never looked so well, and smelting and dressing are proceeding satisfactorily.

NORTH CORNWALL.—The immediate prospects of this mine can be seen by reference to the agent's report, published in another column, but the ultimate value of the property will, it is fully believed, be substantiated by results more quickly realised than probably the most sanguine have any idea of. It is expected by all who have a practical knowledge, and who know the mine, that there is every probability of very large returns indeed being made from the lode in the shaft, which will quickly bring the mine into a dividend state after the erection of proper machinery.

At COMBARTIN, in costeaning the western ground, as decided upon at the last general meeting, four lodes have been discovered, two of them of a most promising character, and upon one of which a shaft will be sunk, and cross-cuts driven therefrom to intersect the other lodes at a greater depth. In clearing the 15 driven by the former workers fine stones of lead are frequently being met with, and on the 15th inst. a stone was taken out that will yield quite 1 cwt. of silver lead. The agents are of opinion that the old workers must have had a good lode in this direction, which is now being cleared up with a view to continue its drainage under the promising lode discovered at surface, about 40 fms. in advance of the point up to which the old level has been cleared.

PARRACOMBE (North Devon).—Excellent progress has been made at this mine during the past fortnight, in spite of the very unfavourable weather. At the present rate of driving it is confidently expected that the lode will be reached in less than four weeks from the present date.

A new company has just been formed for working a valuable silver-lead property in the south-east part of Cornwall, to be called

Trelawny Hills. The grant is an extensive one, and has been obtained on very reasonable terms.

FLAGSTAFF.—There is renewed demand for these shares upon the announcement of further fresh discoveries of rich ore, and the brightening prospects of the company's status and affairs in London. There is, it seems, a very determined effort on foot for bringing about some sweeping changes. Two new elections have it is said, taken place this week, both of an important character. The one is Mr. John Garne, a gentleman of sterling business abilities and substantial means—who has proffered financial assistance to the company; and the other, Mr. John Wild, the well-known director of the Cape Copper Company, whose great knowledge of all matters connected with practical mining and his success, are well illustrated in his achievements in connection with the company which has been mentioned with his name. Mr. Wild's acceptance of a seat at the Flagstaff board is regarded as a happy augury for the future of the company. It is moreover rumoured that further important additions or replacements are to take place at an early date. The value of the Flagstaff Mine is declared to be beyond question; and it is important that a board be installed in whom the shareholders have perfect and united confidence; with this and proper management, early and satisfactory results appear to be within easy reach of all concerned.

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Exhibition Prize Medal—New South Wales, 1877.

AUSTRALIAN TIN—"KANGAROO" BRAND.

Having recently succeeded in REFINING the AUSTRALIAN TIN to the HIGHEST PITCH OF PURITY, the Undersigned is prepared to SUPPLY an article equal to the BEST REFINED ENGLISH.

The uniform assay of the "Kangaroo" brand ranges from 99.70 to 99.90 pure tin. An exhaustive comparative trial of various brands of Australian tin (see annexed report) have proved the

"KANGAROO" BRAND

To be superior to all other Australian tin, and equal to best refined English.

COPY OF REPORT.

"Sydney Galvanising Works, Sydney, Oct. 1, 1875."

"DEAR SIR,—I have much pleasure in stating that I have found the tin smelted at the 'Kangaroo' Tin Smelting Works superior to any other Australian smelted tin I have used in my business up to the present time, and in no way inferior but quite equal to the celebrated 'Lamb and Flag' tin. This opinion has been arrived at after several carefully executed practical tests, as well as from metallurgical assays.

"I am, dear Sir, yours faithfully, S. L. BENSUSAN, Esq." (Signed) S. ZOLLNER."

Messrs. JOHNSON, MATTHEY, AND CO., the well-known Assayers, report on 24th December, 1875, on a shipment ex Durham, 25 tons of "KANGAROO" TIN, 99.95 per cent. pure tin.

In ordering the "Kangaroo" brand the trade will henceforth ensure uniformity of quality, excellence of texture, and absolute freedom from impurity

"KANGAROO" TIN SMELTING WORKS.

Sydney, September, 1877. S. L. BENSUSAN.

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75 Almada, 6s.	30 Frontino, 3 2s. 6d.	10 Pateley Bridge, 4s. 6d.
15 Argentine, 12 12s. 6d.	25 Flagstaff, 2 13s. 9d.	40 Parys Mount, 11s. 9d.
75 Aberdunant, 10 10s.	25 Gorsefold and Merilyn, 10 10s.	60 Penstruthal, 6s. 6d.
10 Alltani, 10 10s.	25 Eberhardt, 4 10s.	75 Port Phillip, 10s. 9d.
15 Barmlyde, 6s.	20 Glenroy, 17s.	25 Rookhope, 4 14s. 6d.
40 Bodidris, 12 2s. 6d.	20 Huitfall, 5s.	15 Richmond, 42 10s.
50 Combmartin, 6s. 9d.	30 Last Chance, 16s. 3d.	10 Roman Grav., 2s.
5 Carlogh, 12 12s.	20 Llanrwst, 10 10s.	50 S. Roman Grav., 9s. 3d.
25 Colorado, 12 12s.	20 Leadhills, 4 18s. 9d.	15 Tankerville, 45 3s. 9d.
80 Chontales, 10s.	20 N. Quebrada, 12 10s.	100 Teocoma, 6s. 6d.
20 Chicago, 12 12s. 6d.	30 Nth. Laxey, 11s. 6d.	10 The Lovell, 42 17s. 6d.
20 Don Pedro, 2s.	25 New Zealand Kap., 10 10s.	30 Van Consoia, 8s. 9d.
30 East Lovell, 12 12s. 6d.	10 E. S. 9d.	10 W. Craven Moor, 2s.
10 East Van, 42 12s. 6d.	25 Marke Valley, 19s. 9d.	15 W. Wye Valley, 10 10s.
20 Devon Consols, 12 12s.	3 Minera, 12 17s.	30 West Pateley Bridge, 40 40s.
20 Derwent, 12 2s. 6d.	20 Monydd Gerdud, 10 10s.	40 W. Tankerville, 16s.
10 Eberhardt, 4 7s. 6d.	15 Pennant, 4s.	40 W. Godolphin, 4 16s.
25 East Caradon, 12 12s.	10 Pestarena, 6s. 3d.	call paid.
75 Exchequer, 6s.	50 Prince of Wales, 6s. 3d.	20 Yorke Peninsula, 5s.

Shares bought and sold at net prices. Telegrams promptly attended to.

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Particulars of the very valuable Mine will be found in the SIXTH EDITION of Mr. MURCHISON'S work on BRITISH LEAD MINES, published THIS DAY, with Maps, &c., price 2s. 6d. The Prefaces to the Six Editions price 1s.

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TANKERVILLE.	ROOKHOPE.
ROMAN GRAVELS.	NORTH LAXEY.
GREAT LAXEY.	GLENROY.
MINERA.	WEST TANKERVILLE.
LEADHILLS.	PANDORA.
DERWENT.	

Full particulars of the above and other valuable LEAD MINES will be found in the SIXTH EDITION of Mr. MURCHISON'S work on BRITISH LEAD MINES, published THIS DAY, with Maps, &c., price 2s. 6d. The Prefaces to the Six Editions, price 1s.

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"Contains a good deal of information that may be useful at present. Mr. Murchison's theory is briefly that on the average British Lead Mines have less of the lottery element in them than any others, and the figures he gives seem to support that view; at all events, those interested in this industry will find his facts and observations worth reading."—*Times*.

"We have great pleasure in recommending his treatise."—*Morning Post*.

"We invite capitalists to look into this means of investment."—*Money Market Review*.

Notices to Correspondents.

* * * In consequence of the inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be kept on receipt; it then forms an accumulating useful work of reference.

"JUSTITIA" (Holywell).—For the benefit of intending shareholders, who alone are interested, the agreement in the prospectus is referred to. We have made enquiry, and find the specific amount is not mentioned, because the greater part of the purchase money can be paid only under peculiar circumstances. The vendors undertake responsibilities regarding the finding of capital, and guarantee the company against every cost and charge in promotion; for this, power is taken to pay up to a certain amount. You propose the insertion of your letter for the good of "intending subscribers," but we cannot see why, considering that every person really desirous of subscribing would possess himself of all the facts before embarking his money. We have also ascertained that those who are most interested in the success of the undertaking have by themselves and friends found the greater part of the capital.

ARGENTIFEROUS COPPER ORES.—If "G." (Paris) will write to Messrs. Wilkes Brothers, Trinity-square, he can obtain what he requires.

Received.—"A. R. C." (New York, Oct. 27 and 30): All have been delivered, and will be attended to next week.—"M. E." (San Francisco): We shall be glad to receive the particulars.—"R. P." (Madras): The letter has been forwarded.—"Shareholder" (Wheat Grenville): You are rightly informed, and the change will be notified in due course.—"T. D." (York): We should be glad of the particulars.—"W. C. H."—(Lancaster): "One Interested" (Bodmin): We believe you are correct, but the matter can hardly be considered a fair subject for public reference.—"N. T." (Dublin): "Constant Reader" (Penrith): "Miner" (Bristol): We shall be thankful for all the information that may be sent to us for publication.—"N. H.": A letter for Mr. G. Henwood, addressed to our office, will be forwarded.—"C. R."—(W. B.)—(G. P.) (Starcross).

THE MINING JOURNAL,

Railway and Commercial Gazette.

LONDON, NOVEMBER 17, 1877.

DETERIORATION OF COAL SEAMS.

That some of our best known coal seams deteriorate, and vary in character, thickness, and quality, is found to be the case in most districts, but the points where the marked changes take place are generally known by the mining engineers acquainted with the different localities. But that this is not always the case we had an illustration just recently at the Monckton Main Colliery, near Barnsley, where the coal was reached about a fortnight ago, and where the change was most unexpected, not only by our mining engineers but best known geologists as well, being unexampled in the mining history of the West Riding. The coal sunk to the well-known Barnsley seam, as it is called in Yorkshire, and identical with the Top Hard of Derbyshire and Notts, is usually found in the Barnsley district from 8 feet 3 inches to 9 feet, and it was generally expected that at Monckton Main, which is only about five or six miles from the latter town, it would be found of something like the same thickness. But the men engaged in sinking met with a very great surprise, and which cannot but be of the greatest importance to the coalowners whose properties are to the north of the new colliery; and, therefore, is worthy of special notice, not only as regards them but to other mineral owners and lessees of mines as well. The sinkers having gone down to a depth of 470 yards came upon what they considered was the entire and real Barnsley seam, but were greatly surprised to find that it was only about 4 feet in thickness. On this being made known to the chief engineer he at once examined the coal, and then ordered the men to go on sinking, which they did for another 7 yards, when they struck another bed of coal 5 feet 6 inches thick, showing plainly enough that it was a part of the Barnsley seam, there being 2 feet of excellent "hards" at the top. This was the first time that such a vast parting was found, severing this fine seam of coal, which covers several hundreds of square miles between Nottingham and Barnsley, and proves that in the northern part of the field the bed is divided by a very thick parting of stone and dirt, which renders the working of it in its entirety by no means an easy matter, whilst the probability is that it increases as it goes forward in the same direction until the division becomes greater, and the seam goes out altogether in bending round eastward, and disappearing under the limestone. However, the sinking at Monckton Main shows in what position the same coal may be expected to be met with still further north, with respect to which our mining body had no previous reliable knowledge.

Underlying the same seam, at an average depth of about 380 yards, there is the well known and valuable Silkstone coal, which in the northern portion of the field is also intersected by a considerable parting of dirt, whilst the quality also varies. The extent of this bed towards Wakefield and Leeds is a matter of dispute, for whilst Prof. GREEN and a few others consider the Blocking bed of West Yorkshire to be identical with the Silkstone coal, most of our mining engineers take a contrary view. The latter, including the President of the Midland Association of Mining Engineers, considers that the Silkstone, and what is known as the Middleton Main, or New Hards coal, which runs from 2 to 4 ft. 6 in. in thickness, are one and the same, the distance between the latter and the Blocking bed being about 100 ft. In some places the Silkstone coal is nearly 6 ft. in thickness, whilst in others it will be from 3 to 4 ft. only, with dirt partings increasing in extent as the coal leaves the neighbourhood of Barnsley and is worked to the north. The quality, however, varies very much, that in South Yorkshire being known as an excellent house coal, whilst in the Wakefield and Leeds districts it is not. Within about a couple of miles of Barnsley, at the Stanhope Silkstone Colliery, which is to the north of the town, there is a dirt parting, which may be said to be the commencement of the separation which takes place in the seam as it is worked in that direction, and increasing as it goes on. This is a new dirt of a particular character, and is quite independent of the thin band found in the middle of the Silkstone coal; and not, as Prof. GREEN has stated, that it is the main dirt that increases, an opinion which is successfully combated by Mr. W. CHAMBERS, the manager of the Silkstone Colliery, who appears to have paid considerable attention to the subject, and who, from observations taken in the workings, shows that the dirt is apart from the dirt found in the seam in most places. Proceeding to the north-west portion of the Silkstone Colliery, the dirt first sets in on one side at $\frac{1}{2}$ in., and goes on increasing until it reaches 4 ft. 2 in., whilst what may be termed the old dirt only increases from 1 in. to 1 ft. One section taken in the pit gave 4 ft. 4 in. of coal and 12 in. of dirt only; whilst another one gave of coal 4 ft. 5 in., and of dirt no less than 5 ft. 2 in.

That they will go on increasing, as in the case of the Barnsley coal, there appears very little doubt from what is known of it. Of course there is great difficulty in working a seam of coal so divided, besides the extra expense that must necessarily be caused in the shape of wages, &c. But one of our objects in calling attention to the deterioration found in some of our best known coal seams when removed a distance in certain directions from where they have long been worked and known is to show how very important it is, in opening out in a new district, that the measures should be first bored through and proved before sinking operations were commenced. In the West Riding of Yorkshire, as well as in many other mining localities, the reverse has been the case, and we could point to works now standing abandoned where, had such a course been adopted, many thousands of pounds would not have been thrown away in vain efforts to reach what did not exist, or, if it did, in such a broken condition as to make profitable working impossible. There is also another point worthy of the consideration of our geologists and mining *savans*—the identifying the various seams of coal in different districts, and placing them under one head, for we have the Silkstone coal called by several names in addition to the one by which it is known in South Yorkshire. In West Yorkshire it is believed to be identical with the Middleton Main, in Lancashire it has been proved to be the Arley Mine, and in Derbyshire it is the Black Shale. In London the seam is known as the Silkstone, and as such is in great demand, more particularly for house and gas purposes, being second only in price to the best Wallsends,

The bringing, then, of all the coals of the same formation under one head, and showing the variations in different districts, is a work that could not fail to be of more than ordinary importance, and would be one worthy of being carried out by our ablest geologists, who would be sure of the cordial co-operation of the mining body for such a purpose.

THE PRODUCTION AND CONSUMPTION OF COAL.

The extraordinary theory of Mr. MACDONALD that miners' wages can only be sensibly increased by the limitation of the production of coal, without any act on the part of colliery proprietors, has been thoroughly refuted by the actual state of trade. During the last few weeks production has fallen off, for in the Durham district alone, according to the statement issued by the executive of the Miners' Association, 16 collieries have been stopped entirely and five partially so, owing to the depression in the trade, whilst in most other districts the men are not working full time. In spite of this state of affairs the price of coal, both at home and abroad, so far from having advanced, has actually declined. If we take London as a fair type of what is being done principally in house coal, we find that the total increase in the consumption for the last 10 months in comparison with the same period of last year was only 25,717 tons, showing plainly that the quantity consumed does not keep pace with the increase in the population, as has hitherto been assumed to be the case. Not only so, but prices are now 2s. per ton lower than they were a few weeks since, although we have nearly arrived at what may be considered the busiest season of the year. This certainly does not bear out the view of Mr. MACDONALD and the poor fanatics who look up to him as their leader and monitor, and who are all evidently opposed to the sensible course and opinion of Mr. BURT, the member for Morpeth, between whom and Stafford's blustering representative there is the widest possible divergence on the coal question, as there is difference in the public conduct of the two men who are sent to the House of Commons as the representatives of the same class of workers. One is as much respected for his modest worth and the sound common sense which he brings to bear on all matters in which the miners of the North of England are interested, as the other is for the virulence and coarseness of his language with respect to all persons officially connected with collieries, more particularly managers, owners, and Government Inspectors.

However, to revert back to the consumption of coal we find that whilst for many years past there has been an annual increase in the tonnage of coal exported, this year will, undoubtedly, be an exemption. This applies more particularly to what is sent to different parts of Europe. This, it might be considered, is one of the results of the war now raging between Russia and Turkey, but is really not so, for the greatest decline has been in the business done with Germany, to which country 185,103 tons of coal were sent last month, against 256,436 tons in October, 1876; whilst Denmark, and Sweden, and Norway have also taken less. This change to a very great extent is evidently due to the action taken by the colliery owners of Westphalia, who are now the keenest rivals our own proprietors have for the trade of the North of Europe, and have certainly made great strides of late. Our exports to Russia last month also fell off to 49,652 tons, against 89,975 tons for October of last year. It may be asked how is it that the German coalowners are evidently supplanting us in several of the European markets where scarcely anything else but English fuel was known? The answer is that they can undersell us in several ports, so that English owners of collieries have been obliged for the purpose of selling the quantity of coal they have done to do so at a very low figure, without considering the question of profit. Notwithstanding the sacrifices thus made, however, they have been unable to maintain the foreign trade, for last month the total exports were 1,283,203 tons of coal, against 1,525,854 tons in October, 1876. Yet whilst the average price during the last-named month was 10s. 7d. per ton, in the present year it was only about 10s. Taking the ten months of 1876, we find that the falling off in the quantity of coal sent abroad was less by 648,599 tons than for the corresponding period of last year, the respective returns being 13,181,103 tons and 13,829,702 tons, and the deficiency is certainly not likely to be made up before the new year. The actual condition of the trade at present may be easily summed up—a falling off at home in the consumption of coal for household and manufacturing purposes, a marked decline in our exports, with low prices for what is required both at home and abroad, a number of collieries entirely standing, many only partially employed, and some thousands of men and boys entirely idle. Yet with these facts staring us in the face we are told that the time has arrived when in the interest of the miners throughout the country it is necessary that the present output of coal should be limited.

OUR RAILWAY IRON ABROAD.

The experience afforded by October in the rather important matter of the external demand for our railway iron is rather more encouraging than might, perhaps, have been expected. The total shipments of the month were 56,048 tons, as compared with 37,728 tons in October, 1876, and 40,732 tons in November, 1875. The foreign demand, properly so called, was extremely weak in October; but the colonial demand came bravely to the rescue. If any proof is wanted of the accuracy of this assertion, it may be found in the fact that we sent no railway iron whatever to the United States in October, and only 5101 tons to Russia in the same month, although in October, 1876, the Czar's empire absorbed 10,310 tons. The exports to Sweden and Norway and also to Spain presented some improvement in October, but the deliveries in almost all other directions were really insignificant. But then, as we have just observed, the colonial demand came bravely to the rescue. In October the deliveries to British America, British India, and Australasia compared as follows with the corresponding exports in October, 1876, and October, 1875:—

	October, 1875.	October, 1876.	October, 1877.
British America	750	3,324	4,013
British India	6,303	4,479	23,249
Australasia	9,193	3,973	10,306
Total	16,256	11,776	37,568

The large demand on British Indian account is attributable to the vigour with which the Anglo-Indian Government is prosecuting the network of State lines. Of late, too, there has been an important development of traffic upon the leading Indian guaranteed lines, such as the East Indian, the Great Indian Peninsula, the Madras, and the Bombay, Baroda, and Central India; and as these lines now involve scarcely any burden to the Anglo-Indian Treasury in respect of its guarantee of interest, the Secretary of State for India in Council is not very chary of sanctioning extensions, sidings, duplications, and permanent way improvements. Such works as these necessarily absorb a considerable quantity of our railway iron, and it is a most fortunate circumstance in these times of extreme difficulty and depression that this should be the case.

The statistics of our export iron trade for the past two years—and it may be well to note that the aggregate exports to Oct. 31 this year were 419,161 tons, as compared with 358,873 tons in the corresponding ten months of 1876, and 488,212 tons in the corresponding ten months of 1875—point unmistakably to the conclusion that credit has altogether shifted its ground during the last two eventful years. Thus, in consequence of the default of interest which occurred upon Turkish bonds in October, 1875, there has been an almost complete collapse in our exports of railway material to Turkey, only 299 tons having been sent to the Ottoman Empire in the first ten months of this year. The three principal South American countries—Brazil, Peru, and Chili—have also suffered severely from the distrust entertained of foreign bonds. The exports to Brazil have, upon the whole, shown some advance this year; but the deliveries of our railway iron to Peru and Chili can now be only reckoned by hundredweights where before they were calculated by tons. Taking the South American market generally in October, it must be said to have exhibited extreme weakness in that month. Thus, in October we only sent to Brazil 1923 tons, to Peru 217, and to Chili 39 tons, making an aggregate for the month of 1962 tons. The corresponding exports in October, 1875, were:—To Brazil 2441 tons, to Peru 165 tons, and

to Chili 65 tons, making an aggregate of 2671 tons. On the other hand, amid the crash of imaginary credit in Turkey, Egypt, South America, and elsewhere, Australian and Indian securities have been sensibly gaining ground during the last two years; and the result has been that there has been a large increase in the consumption of our railway iron in our Eastern Empire and our Antipodean dependencies.

COPPER SMELTERS—COPPER MINES.—The continued great fall during the last six months more especially, in the standard for such mines as Devon Great Consols, South Caradon, West Tolgus, Mellanear, West Seton, Marke Valley, Crebor, Glasgow Caradon, and others, selling as they do large quantities of copper ores at a most low price given by the smelters, and it is high time the managers of Cornish and Devon copper mines held a meeting to take some joint action in the matter, for, according to facts and figures already obtained, the copper smelters can well afford to give considerable enhanced prices for ores, and still make a magnificent profit. Surely it is to the interest of the smelters not to be too grasping these hard times, but to stretch a point in order to keep all those mines worth being worked at work, and avoid a great collapse, which it is greatly feared must fall ere long upon some of the struggling companies.

PREVENTION OF COLLIERY ACCIDENTS.—Our views with respect to Ansell's Fire-Damp Indicator, as stated in last week's Journal, have been fully borne out by a letter (published in another column) from Mr. J. Brown, who was formerly the consulting engineer of the Oaks Colliery. He fully endorses what we said as to the ingenuity of the invention, as well as to its entire worthlessness for colliery purposes, and that explosions in collieries will take place despite the amount of ventilation. Expression was given to similar views a few days ago by Mr. T. W. Embleton, the oldest and most eminent consulting mining engineer in Yorkshire. He said that as to the working of collieries, they must always look to the safety of the workmen, and in doing so have a certain amount of ventilation, but there were times when the gas would not be sufficiently diluted with a sufficiency of fresh air. He had had considerable experience on the subject, and on one occasion, when 23,000 cubic feet of air was passing per minute, he had examined the workings himself, and had found gas. How was it possible, then, that this part of the Act relating to ventilation and dilution of gas could be fulfilled, and how was it that Mr. Macdonald said those who did not comply with the Act were murderers? He showed he knew very little about the subject. Such accumulations of gas were very frequent in the South Yorkshire district, and though the greatest amount of ventilation might be provided explosions would take place, and could not be prevented. He said from the first that the present Act of Parliament could never be carried out, for those who made it were totally ignorant of the circumstances. It was impossible to prevent accumulations of gas, and no ventilation would remove it. At the Oaks Colliery 140,000 ft. of air were passing per minute, yet an outburst of gas occurred, and the lamps were suddenly put out. If nothing had happened it would have been said that the place was perfectly safe, but if there had been anything wrong with the lamps there would have been an explosion. Therefore he said that the Act of Parliament could not be carried out, and ought to be altered. We have here the opinion of one of our most eminent engineers, against that of those who know little or nothing of mines or the mode of working them.

GETTING COAL WITHOUT GUNPOWDER.—In another column will be found an interesting account of some experiments in weighing down coal by hydraulic pressure, in order to obviate the difficulty experienced in driving the wedges by hand labour. The arrangement is the invention of Mr. Israel Knowles, of the Pearson and Knowles Coal Company, at Ince. The trial was made in the Pemberton Fire-Brick Mine. A half-inch hydraulic ram was used, and connected to the wedge by iron tubing. The weight of the coal dislodged was about 4 tons, and the proportion of slack was much less than usual. Much interest was expressed in the trials by all present, and there was a general opinion that the invention will prove equally advantageous to coalowners and working colliers.

COAL AND IRON IN THE UNITED STATES.—Transactions in steel rails at New York have been heavy; besides some large contracts known to be closed, but the particulars of which have not transpired, a sale is mentioned of 12,000 tons on private terms. The sale has also been noted of 1210 tons for the Cracy Island Railroad, to be delivered at Bay Ridge, Brooklyn, at \$41.60 per ton currency. The Philadelphia market for steel rails appears to have settled down to about the old quotations. The total sales for October at Philadelphia amount to about 60,000 tons, the market closing at \$40 to \$42 per ton currency at the mills. There are further enquiries, and it is expected that at least 40,000 tons more will be disposed of before the close of the year. Business in iron rails has continued dull at Philadelphia, and nothing of importance has transpired for some time past. There has been little change in the pig-iron trade at Pennsylvania. No transactions of importance have been reported at Philadelphia in plates or tank iron. The bar iron trade has been ruled generally dull at Philadelphia. The coal markets have been weak, and quotations for all brands of coal have been low—some, indeed, as to leave scarcely any profit.

INVENTORS' INSTITUTE.—For promoting and protecting the interests of the less wealthy class of inventors intending to offer evidence of their ingenuity at the International Exhibition of 1882, the late Mr. R. Marsden Latham, M.A., Barrister-at-Law, conceived the happy idea of inaugurating an institute which should bring together the previously divided and not very satisfied class—inventors—in such a manner that all should be led to comprehend that they had many interests in common, and that it was to their mutual advantage to act in concert. In a very short time the list of members, under the presidency of Sir David Brewster, included a large proportion of the leading inventors of the country, Whitworth, Bessemer, Siemens, Varley, and others of equal repute, occupying positions on the council. Sir David Brewster, and several other warm supporters of the Institute, have passed away, and others have grown too old to take the same active part in the business of the society as formerly, but in the secretaryship the original founder has been succeeded by his colleague, Mr. F. W. CAMPBELL, Barrister-at-Law, who is equally well acquainted with the requirements of the members, and thus the Inventors' Institute retains vitality, and will inaugurate its 16th annual session at the rooms of the Royal Society of Literature, Charing-Cross, on Nov. 29, under the presidency of Sir ANTONIO BRADY, J.P., F.R.S., who has ever been recognised as a warm advocate of inventors' rights, and who, during the time he has occupied his present position, has given great satisfaction to every member from the energy he has displayed in connection with every movement on their behalf, and on behalf of inventors in general. It is but reasonable to anticipate that in view of the forthcoming International Exhibition at Paris the numerical strength of the institute will largely increase, as it is not unnaturally suggested that whatever may be the advantage of membership in connection with international exhibitions in England, it must be far greater in connection with those in countries the language and customs of which are different.

STONE-BREAKERS.—According to his improvements in Black stone-breakers, Mr. EDWARD GIMSON, of Stalybridge, constructs a strong frame having two fixed jaws facing inwards towards each other, and acting between and against these he has two movable jaws facing outwards. These jaws hang upon strong centres, and are actuated alternately by means of a rocking lever and two "toggles" placed between them. The rocking lever is centred between and is rocked by means of an eccentric formed or keyed upon a shaft passing through the same at or near its upper end. The eccentric works in a brass or bearing which slides vertically in a slot in the rocking lever, so that it merely rocks the latter without moving and lowering it. The brass is made square, so that when worn at the sides it may be turned one-quarter round, and used again in

The bearings or brasses which support the main shaft, as well as those of the axes of the rocking lever, are also formed so that they can be turned one-quarter round for the same purpose. The lower ends of the movable jaws are connected together by means of two tension rods meeting at or near the centre; the end of one rod is chased with a right-hand screwed thread, and that of the other with a left-hand thread, and the two are connected by a right and left-hand screwed nut. By turning this nut in either direction the tension rod is either lengthened or shortened, and thus the spaces between the movable and fixed jaws is diminished or enlarged, and the size to which the stone is broken is consequently regulated.

REPORT FROM CORNWALL.

Nov. 15.—The error which was made in London last week in connecting with the tin standards is, perhaps, hardly to be wondered at, though possibly a little reflection might have led to the conclusion that it was too good to be true. As a rule, however, people are much more ready to believe bad news than they are good, and we may, therefore, interpret the ready acceptance of the announcement of the "other 5s." as a proof of the confidence felt in the improved position of the tin market, and of the aspect of mining affairs generally. The was, however, blunder or no blunder, no particular reason for any reaction. We take it that the shares sold under the influence of the report were in most cases at a rate worth quite what was given for them, so that if the sellers did profit the buyers were not particularly injured, save from a purely speculative point of view. It is very easy to see how the mistake was made, and how it might readily have arisen in the purest innocence. It was perfectly true that the smelters did put up the standards 5s. a cwt., but that that meant, of course, depended entirely upon what was taken at the starting point. They took their last official figures which a couple of rises, one of 3s. and the other of 2s., had left quite in the background, so that all they did was to make that official which had been unofficial. This was, no doubt, an important step, so far as confirming the upward tendency of the market, and giving good ground to hope for another probably "unofficial" move before long, but it was a very different thing to taking the actual market prices at the starting point. The lesson we draw from this is one which we have had occasion to point out more than once—that if we are to have official prices at all they should mean what they profess to mean. They must be open to a little fluctuation in the intervals between the meetings of the smelters, but surely something might be done to make the correspondence more exact than it has been of late.

The impression in Cornwall is that there will be another rise in the tin standards, certainly before the month is out. We shall see what the Banca sale will produce, but we may not have to wait so long as that. It is not at all unlikely that if current anticipations are realised the stocks of black tin now held in the county will see some reduction before the new year, but they are in excellent hands, and there is no fear that they will be launched upon the market to the detriment.

The china-clay market appears to be overstocked, which is no wonder, seeing the manner in which production has been stimulated and developed of late years, and the way in which the demand has sympathized with the general flow of trade. There is likely to be a considerable exodus of the men, in consequence of the want of employment.

At the South Crofty meeting it was stated that the cost of working the Burrow borer is rather less than that of hand labour. This is a very important point. It has been stated, on the other hand, that the cost of working the Beaumont borer is in excess of hand labour. It is not possible to have exact statistics in either case. The point is really a most important one; for the borer which will do three times the work of hand labour at a lesser cost is likely to be more useful in ordinary mining operations than one which will do six times the work at an increased cost. Why does not some one furnish exact details?

Deeply there is much sympathy felt with Capt. John Bawden, of Dolcoath, and his family, at the sad intelligence which has reached them from Mexico. Capt. Bawden's son—in the prime of manhood, intelligent and successful mine agent, and a most affectionate father—has been killed in an unfortunate dispute with some of the Mexicans near his home, at the Real del Monte Mine. Capt. William Bawden, the deceased, learnt his business under his father at Dolcoath just as his parent, when a boy, applied himself to his duties under the late Capt. Tredinick, Petherick, and Charles Thomas. Capt. John Bawden does not disregard science or theory; he holds, however, that a man of common sense will listen to the theorist, and will give a still more attentive ear to what science may have to say. But that no good mine captain can be made by either or both, and must come from years of patient yet intelligent work and observation underground and at surface. He gave expression to some such views on a semi-public occasion only a few months ago, and—man of 55 and of 11 score—was able heartily to respond to the toast of his "Good Health." Since then some internal disease has laid reduced the hale and stalwart man, and this news has added to his ravages. The number of Dolcoath agents who have languished from some internal complaint is rather remarkable.

TRADE OF THE TYNE AND WEAR.

Nov. 14.—There is little to report in connection with the Coal Trade, no branch of it can be described as brisk excepting gas, which continues very steady. A severe winter would have caused an increased demand for house coal, but there is no appearance of that at present. The Hamstead Colliery has been stopped, but to balance the Wheatley Hill and Ludworth Collieries, belonging to the original Hartlepool Company, have again been started. Those mines were closed some time ago mainly on account of differences between the masters and workmen, but their disputes have now been happily adjusted. The number of collieries closed in Durham is five and five partially, while in Northumberland about 13 works are closed, so that if we take 30 collieries, and the annual output at each work, which is not excessive, be got an annual production of the output of 3,000,000 tons. The process of bringing the output down to the demand for coals is, therefore, going on. The men out of work in both counties have been to a great extent supported from the funds of the Union, and this has had the effect of relieving the ratepayers. In Northumberland the funds of the Union have for this and other purposes been drawn on liberally, and they are now nearly exhausted, and the men are urgently requested by the Union officer to increase the amount of their fortnightly subscriptions. It is certainly a heavy burden for the men to bear this contribution, as their fortnightly earnings are so much reduced owing to bad trade. In Northumberland there are 50,000 miners, and of these one in 15 are idle at present. In Durham there are 50,000 miners, and one in 10 are out of work, and these are supported from the funds of the Union.

There was a meeting of the North of England Institute of Colliery Engineers on Saturday at the Literary and Philosophical Society, Newcastle, when the chair was occupied by Mr. John Coulson. A paper was read by Mr. John Gibson, of Ryhope Colliery, "On Wire Ropes and Fastenings"—a most important practical subject, and it was discussed after the reading of the paper, but a more full discussion is expected at the next meeting of the Institute. The Whitburn new winning the boring on the Chaudron system, on the whole, to progress well, although, as was anticipated, they find that the limestone is very hard and difficult to penetrate. The bore—5 ft. in diameter in the centre of the shaft—has reached a depth of 120 ft., and as the shaft was completed on the system to a depth of 160 ft., the total depth from the surface is 280 ft.

Iron Trade, both for pig and manufactured, continues very quiet in most branches, but in Cumberland there is considerable activity in both the steel and iron trades, and it is expected that the furnaces now out will be re-lighted shortly. New steelworks are likely to be erected; ground has been secured by the North Hematite Iron Company for this purpose near to their works, the whole of which continues in full blast. For the new

steelworks 14 acres of ground has been leased, and it is expected that an early commencement will be made with the erection of the works. The working of the collieries and brickworks in Cumberland has also improved a little.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Nov. 14.—Considerable indignation is felt in this region at an unjustifiable attack on the orderly character of the working population of North Wales recently made by a letter written in the Times. This writer instances the Mold collier riots of some years ago, and those which have more recently taken place at Hafod-y-bwlch, near Ruabon, and at Bagillt as examples of the lawlessness of the Welsh people. The writer might, at least, have made himself acquainted with the facts before he rushed into print with so grave a charge. Those who know the districts in question are well aware that, situated as they are on the very outskirts of North Wales, they contain a very mixed population, and that there is a large proportion of low English and Irish workmen, who have been attracted by the works and collieries of the district. The writer also fails to estimate the extreme provocation which in two of the cases alluded to especially the rioters had received. To study the character of the masses of Welsh working men proper the writer should spend a short time among the slate quarries of Festiniog and Llanberis, for I will venture to say that for thrift, respectability, order, and sobriety no community of working men can be found to equal the dense population of those districts.

Notwithstanding the general depression in trade at home, and the closing of the Baltic ports for the winter, the Slate Trade of North Wales keeps uncommonly good, and there is a movement among quarry owners for another advance in price. The advances made during the last ten years reach a total of 30 per cent. on the current prices of 1867. The ports are crowded with ships waiting for cargoes, and it is rumoured that the difficulty of obtaining these leads to the extortion of a good deal of "backsheesh" from the captains. If this is true it is a serious matter, and one that ought to be well looked into by the owners of quarries, who, after all, will doubtless have to pay. Two advertisements in the *Mining Journal* show a little movement in the development and transfer of slate quarries. The Castle Cidwen Quarry is in the midst of a good district, but one that for want of railway communication has hitherto been neglected. Several small trials of great promise have been made round Quailyn and Dinas lakes, and now that an instalment of the proposed narrow-gauge railway from Carnarvon via Beddgelert and Capel Curig to Bettws-y-Coed is made the district ought to attract capitalists. The vendors are, however, in error in supposing that their quarry is on the same series of veins as those worked in the Penrhyn and Dinorwig Quarries. Their vein or bed is several thousand feet higher up in the series of strata than those of the quarries named, and it is nearer the horizon of the Festiniog veins. The owners have, however, only fallen into a common error. If all the slate quarries in North Wales said to be on the Penrhyn and Dinorwig vein were really worked on it, that vein would be of a peculiarly circular and ambulatory shape. There is no need for the vendors to borrow merit. I agree with your correspondent, who thinks that the promoters of the Dynn Slate Quarry should, in asking for money, have given more precise information. Is the quarry an old one resuscitated? If so, when was it last worked, what work has been done, and why was it abandoned? The quarry may be none the worse for being an old one, because some of the best quarries in Wales have at times been abandoned, but in these days it is best for borrowers to give and for lenders to receive the fullest information. I would add that Curris can hardly be said to be near; it is ten or twelve miles from the quarry, and here, again, it is a pity that fictitious merit should be borrowed for an undertaking that may have within itself all the elements of success.

An effort is being made to raise additional capital to work the Pool Park Lead Mines, which, lying to the south of the Minera Mine, are to be called South Minera. These are old mines, and large sums of money have been expended on them. One of the original adventurers was the late Mr. Edward Morris, the owner of the Van Mine, when its success was assured. Hitherto the adventurers have not been rewarded with the success they have deserved, but as the mine is in a highly mineralised range of limestone, and closely adjacent to a successful mine, let us hope they will with this effort attain it.

It is rumoured that the works of the Daywell Colliery, near Gobowen, are about to be resumed. This undertaking was started in 1873, and two shafts have been sunk to what is probably the Dirty or Drowal coal, below which, at a depth of from 20 to 30 fathoms, the Quaker coal of the district should be found. On the whole, the coal trade of the district is depressed, as is evidenced by the trains of loaded trucks that fill most colliery sidings. The old limestone quarries worked for many years by Mr. Wright, near Llangollen, are offered for sale. These have communication with the Great Western Railway, and with the Shropshire Union Canal, and have been worked successfully for many years. But the last two years have been bad ones for trade in limestones used as fluxes, owing to the depression in the iron trade.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Nov. 15.—In the Coal Trade business has not improved since my last. The prices of slack are kept low by an increase of stocks. Ordinary forge coal is quoted 7s. 6d. to 8s.; best forge with furnace coals remain heavy. Prospects as to finished iron are not brighter. Unless by the end of the year a customer can be found for the raw and finished ironworks and the collieries of Messrs. G. B. Thorneycroft and Co. they will all be shut down. The Cleveland Ironworks, near Wolverhampton, lately occupied by Messrs. Shenton Brothers, have been purchased, and will be carried on by Messrs. John and Isaac J. Jenks, of Wolverhampton. The obstacle to a successful termination of the difficulty that has arisen as to the sliding scale for the regulation of wages in the coal trade has been removed by the colliers of Dudley and Netherton (who before had held aloof) having now agreed to the new terms. And the second meeting of representative coalmasters and colliers' delegates, held at Dudley, to which I referred in my last, has confirmed the scale previously determined upon.

On the Birmingham Exchange the shares of the Sandwell Park Company have changed hands at 8½ prem., but more lately at 8½ premium. The property of the Cannock and Huntingdon Company has been sold for 6s. The shares of the Patent Shaft and Axletree Company (Limited) have been obtained at ¼ dis., and of the Staffordshire Wheel and Axle Company at 1½ premium. Muntz's Metal property has changed hands at 2½ prem. The 20½ shares of the Aldridge Colliery are quoted by holders at 35½; buyers of the Spon Lane Colliery Company's shares stand at 6½ dis.; holders in the Willingsworth Colliery would sell out at 3 dis., and in the Walsall Wood Colliery at 2 dis. Holders in the Darlaston Coal and Iron Company quote 7 dis.; buyers in the Chillingdon Iron Company offer 3½ 10s., and in John Bagnall and Sons 3½ 5s., in each case for the 10s. shares.

Two colliery accidents, resulting in the death of four miners, have happened at Dudley. On Saturday a fall of coal—due to what is locally known as a "bump," or pressure from the superincumbent strata—occurred at the Prince of Wales pits, belonging to the Dudley Colliery Company, by which two brothers were killed; and on Monday a large piece of coal fell from a rib which was being worked at the Oakham Colliery Company's pits, burying two men. In each case a third man was injured, but they are likely to recover.

In North Staffordshire it is not an easy matter to secure orders for all the coal brought to bank, notwithstanding that several collieries are idle as the result of the men still remaining out against the late reduction. Work at the iron-ore mines is more than quiet. The pig-iron trade is dull. The finished iron trade has not improved, and the bar mills are running only four days per week.

A curious case in connection with neglect of the Coal Mines Regulation Act has been heard at West Bromwich. Frederick Crane was summoned, as engineer and also as engine tender at Gold's Green

Colliery, for neglect of the third and eighth special rule for neglect to examine the boilers and machinery daily. Mr. Beddow, one of the owners, appears to have been his own certificated manager and his own colliery engineer; at least there was no one between Crane and Beddow. Mr. Beddow had since died, and Crane had charge of the machinery. In March he new-lagged a drum in such a way as to shorten the horns, and in the result the rope miscoiled, dropped a barrel, and killed two sinkers. Granger, the other engine tender, was similarly charged. Both men were regarded as engine tenders only, and fined 10s. each, and costs.

The Walsall Wood Colliery Company have been successful in their efforts to reach the Thick coal of the Cannock Chase district. It is at a depth of 545 yards, and is 4 ft. 10 in. thick. A 15 ft. shaft has been sunk to this Thick coal, and, so far, the aggregate thickness of all the coal passed through is 40 ft. The shaft is one of the deepest in South Staffordshire.

The action which the Mines Drainage Commissioners intend to take with regard to obtaining further powers to amend their Act of 1873 is much discussed in both coal and iron trade circles, and is likely to meet with considerable opposition, as several large colliery-owners have, it is said, resolved to spend a great deal of money rather than allow the Commissioners to have more sway. A good many look upon the operations of that useful body with great disfavour, especially those who are not much benefited by their operations, and still are called upon to pay the rates levied. The general good of the district is not considered. At last week's meeting of the Commissioners Mr. R. Williams drew attention to the exorbitant claims for pumping and other work done for the Commissioners by almost everybody with whom they came in contact as to the surface drainage.

Exaggerated rumours have been current in some of our contemporaries within the last few days that the New British Iron Company are about closing their extensive Congreaves Works, at Cradley, near Dudley. We learn authoritatively that the works were only standing last week, owing to the slackness of trade. The company are preparing to start their machinery as usual. They have, like many of their competitors, been working with only a small margin of remuneration, while others in this district it is well known are making iron at a loss.

The coal and iron trades have, as it were, attained civic honours in this district this month. For Mr. David Kendrick, the senior partner of the Willingsworth Furnaces, near Wednesbury, has been chosen Mayor of the town, and Mr. William North, mining engineer and coalmaster, has been elected to a similar office in Dudley. The new Mayor of Sheffield, Mr. Mappin, is a steel manufacturer.

We understand that the fund now being raised on behalf of the widow and family of the late Mr. John Jones, the general secretary and, to some extent, the founder of the Iron and Steel Institute, and who was at one time the secretary of our South Staffordshire Ironmasters' Association, now amounts to upwards of 1850£. Among the list of contributors are the Duke of Devonshire, K.G., 150£; Bill Brothers (Limited), 100£; Henry Bessemer, 100£; Bolckow, Vaughan, and Co. (Limited), 100£; Consett Iron Company (Limited), 100£; Robert Heath, M.P., for Stoke, 100£; William Menelaus, 100£; B. Samuelson and Co., 100£; Dr. Siemens, 100£; William Whitwell and Co., 100£; Walter Williams, 20£; E. Fisher Smith, 20£; &c. Further appeals are being made to those members of the iron and steel trades in this country who have not yet been appealed to. Mr. Jones's great merits were well recognised verbally at the meeting of the Iron and Steel Institute, held at Newcastle, and it was felt that to assist his widow and family, whom he had left in poor circumstances through the failure of certain ironmaking firms in which he had invested his savings, would be the best means for practically showing their appreciation of his services. —*Wolverhampton Chronicle*.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Nov. 15.—There has been little change in the state of the Iron Trade of either Derbyshire or the West Riding during the past week. The production of pig is much as usual, and is being pushed in some comparatively new markets. In Sheffield there is a little more doing in some of the cutlery branches, more particularly for Australia and other of our colonies, but not sufficiently so to find full employment for all the hands. The creditors of the Northfield Iron Company having agreed to accept a composition of 10s. in 1£, it is expected that the concern will shortly be again in full working operation. Steam coal, it may be said, has been moving off very well, the Baltic being kept open this year much beyond the usual time. In house coal a fair trade has been done both locally and otherwise, but prices have undergone very little alteration.

The rules of the Widow and Orphans' Fund of the South Yorkshire and North Derbyshire Miners' Association have been submitted to Mr. F. R. Neison, actuary of London, in order to ascertain the relative advantages of that fund, and the Miners' Permanent Relief Fund recently established in South Yorkshire and North Derbyshire. His report, presented to the Miners' Association on Monday, shows that to provide the benefits set forth in the rules of the South Yorkshire Miners' Association to widows and orphans in cases of accident and natural causes, would require ten times more than the present rate of contribution, whilst the Miners' Permanent Relief Fund, providing only in cases of accident, is founded on a reasonable basis. The matter was discussed by the council, and left over for further consideration.

A meeting of the Northfield Iron Company (Limited) has been held at Sheffield, to receive a report as to the resolutions adopted by the creditors of the company at their meeting on the previous day. The creditors had, after discussion, decided to accept a composition of 10s. in the pound, but amongst them there was one dissident who declined to sign the resolution. Subsequently, however, he was prevailed upon to do this. The shareholders of the company were called together in order that they might pass resolutions for raising the necessary money. This was proposed to be raised in the form of mortgage debentures of 10,000£, bearing interest at 7 per cent. There was only a small attendance of shareholders, but 5700£ of the 10,000£ required was subscribed at the meeting. The shares of the company are 10£ each, of which 8£ 10s. was paid up.

The South Yorkshire Colliery district has of late undergone great and important changes, and within the past 12 months the sinking and opening out of new collieries have been carried on to a wonderful extent. Scarcely a week passes without revealing some evidence relating to the way in which the minerals of the district are being developed. Within the past few years a large amount of wealth has been invested in the trade of the district. At no very remote period the output will be very largely increased, and it seems to almost baffle the uninitiated to see how or by what means it is to be consumed. Of late, with an improved trade, the tonnage raised has been sufficient to meet all demands. There must, however, be some redeeming feature in the trade of which the outsider is not aware, for of late great capitalists and men of undoubted experience in the trade have invested large sums of money, and many of them are either large consumers or noted merchants and exporters of fuel. Amongst others, it may be stated that M. Josse, the great continental exporter, Mr. C. Wells, of Hull, the Barrow Coal and Iron Company (Limited), Messrs. Cammell and Co. (Limited), and others, are personally interested in the collieries of the district. The whole of the new collieries now in course of being opened out are on a large scale, and many of them will be able to raise fully 1000 tons per day, an employ from 300 to 400 men each. As might be expected, so vast an outlay of wealth has increased the number of inhabitants. Small towns, in some instances reaching as high as 300 houses, have within the past two years been erected by the owners of collieries and by private individuals. Amongst the collieries now in a forward state of being opened out, the following may be instanced:—The sinkings at the South Kirby Colliery, which were begun in 1875, are in a forward state, having reached a depth of over 400 yards; at Monkton Main, where the coal has been reached at a depth of 475 yards, two splendid 17 ft. shafts are being put down; the work at the Houghton Main Colliery is progressing. In addition to these, coal has been recently won at Watt Main, Hemsworth Main, and several other large collieries.

At the Dodworth Silkstone Colliery, near Barnsley, where the men have been on strike for some months, an effort is about to be made to do without the services of the old hands by the appointment of non-unionists. For that purpose some of the extensive rooms at the colliery are being fitted up with beds and all the essentials for

making ample provision for the men inside the works. A "buzzer" that will be heard for a considerable distance is being fitted up so as to give warning of any attempts at violence on the part of the old hands, which is not considered at all improbable.

REPORT FROM THE NORTH OF ENGLAND.

Nov. 15.—The shipments of coal from the north-east ports continue to be on a limited scale. It is all but certain now that the aggregate shipments for the current year will fall much short of those for the previous 12 months. In 1876 upwards of 7,000,000 tons of coal were shipped from the Tyne ports alone, being considerably more than the shipments of any previous year. Throughout the last 10 months foreign shipments from the Tyne compared unfavourably with those of either of the two previous years, and it is highly probable that the year 1876 represented the maximum for some years. This suggests the reflection that Cardiff, which is so rapidly coming to the front as a coal exporting station, may before long come abreast of Newcastle; at any rate, the people of the chief South Wales port are going the right way to work to bring this result about. They are now projecting the very extensive plan of docks, and they are finding for the trade every possible facility of development. A few years ago Cardiff was nowhere near Newcastle in respect of its coal shipments, whether foreign or coastwise. Now, however, its foreign shipments come so near to those of the more northern ports as to justify an expectation that it will ultimately go far beyond them, and this conclusion is still further warranted by the fact that the Welsh coal field has a reserve three times as large as that of the Great Northern.

In reference to the Iron Trade there is a positive dearth of news. The demand for pig-iron varies but little from week to week, while prices have maintained for months a remarkably dull level of uniformity. Business was done on Tuesday at 44s. for No. 1, and 40s. for No. 3, less 1 per cent., and f.o.b. Tees. The utmost efforts of the "bears" cannot pull quotations below this standard, although it is no secret that some considerable quantities of iron have changed hands for less money. Shipments of pig-iron are not on a large scale for foreign requirements, but they keep up to a higher standard than the average so far as the United Kingdom—and more especially Scotland—is concerned. Three more furnaces have been put in blast by Messrs. Jones, Dunning, and Co., at the Normanby Ironworks, which is a circumstance strongly indicative of the possibility of making pig-iron at a profit under fairly economical conditions. Most of the ironmasters in Cleveland are working their furnaces so as to produce a larger quantity of pig-iron than they have been accustomed to do before. Last year the average was not more than 47 or 48 tons per furnace per day, but at the present time the average is about 55 tons, or rather more, so that the maker has at least the advantage of a larger output in his favour. At the Linthorpe and other works improvements and changes in the mode of working have recently been introduced with the view of securing the fullest yield of which the furnaces are capable. With the favourable weather that has recently prevailed shippers have been pressing forward deliveries of pig-iron, and causing a good deal of activity at the furnaces.

The finished Iron Trade continues very dull, except in respect of ship-plates, which are being turned out in large quantities. The production of ship plates in the North of England is now about 200,000 tons per annum, and it is worthy of remark that not only do Cleveland firms supply shipbuilders in their own district, but the bulk of the Clyde firms as well. Prices current are—Ship-plates, 6s. 5s. to 6s. 7s. 6d.; sheets, 7s. 15s.; angles, 6s. 2s. 6d.; common bars, 5s. 15s.; and rails, 5s. 15s. per ton, less 24 per cent. commission, and free on trucks at works. Except on plate orders, the finished iron manufacturers in the Middlesbrough district are doing very little. So much indeed is this the case that nine firms have more than 200 puddling furnaces entirely idle.

In mining matters nothing presents itself *couleur de rose*. On the contrary business is dull almost to stagnation. Few of the mines in Cleveland are now working full time, and the heavy stocks of ore that have been accumulated will prevent the revival of trade from being so soon felt, even when it is accomplished. Of coal, coke, and ironstone together some 7000 tons less are now being sent over the North-Eastern system than at this time last year, and the reduction in the railway receipts for mineral traffic vary from 1000l. to 4000l. per week.

REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

Nov. 15.—True to time, as predicted by the Americans, a storm of wind and rain arrived in this country in the early part of the week. The damage in this district was great, and was caused mainly by the floods, but to the local ironworks and collieries no material damage appears to have been done. A serious disaster was the falling in of a portion of the Vale of Neath Tunnel, which has been constructed about 25 years, is about two miles and a quarter long, and belongs to the Great Western Railway Company. Fortunately no one was injured. This is not the first occasion on which an accident has occurred in the tunnel. In order to strengthen the work men were employed at the time of the accident to double wall and double arch it. It will be some months before traffic by this route can be resumed. To refer next to the staple trades of the district, there is manifestly an improvement in the iron industry, so far as shipments are concerned; and there are some fair orders for railway iron in hand, India being our best customer at the present time. Then, during the week we have had clearances to Sweden and Norway and South Australia, and Brazil again figures on our books. What has been urged, therefore, as to the almost total collapse of the iron rail trade has not come to pass yet. There appears to be a little more doing in bar-iron, and prices exhibit a change for the better. Pig iron is materially unchanged, but stocks are to some slight extent diminishing. The steelworks are employed at about the average rate. Tin-plates are materially unaltered.

As will be seen by the figures quoted below, foreign orders are diminishing, and have made an appreciable difference in the returns of shipments. The steam coal trade is rather quiet, and not quite so much briskness characterises the house coal department. Many of the men are earning but low wages, and the winter promises to be a hard one for many. The patent fuel trade is rather dull; while Cardiff improves its shipments, Swansea shows a falling off. It has previously been stated that notices have been given to terminate contracts in the Aberdare Valley and elsewhere. It is believed that about 600 men at least will be turned off. At a meeting of Mountain Ash colliers they passed a resolution protesting against any restriction of labour under present circumstances. The Baina colliers have held a meeting to consider the 5 per cent. off wages, which the Nant-y-Glo and Blauna Company has refused to restore. A deputa- tion waited upon Mr. Brown, the manager, on Monday last, but he declined to again open the subject. The colliers employed by Messrs. Brozden have held a meeting at Maesteg respecting the notice of a 5 per cent. reduction, and decided to resist it. On the other hand the men engaged by the Powell's Llanwit Company have decided to accept a 5 per cent. decrease.

The following returns of iron, coal, and patent fuel may prove of interest to readers of the Journal. The periods compared are last month and the same month of 1876 respectively:—Iron: Newport, 5170 tons against 6602 tons; Cardiff, 8468 tons against 3718 tons; Swansea, 247 tons against 16 tons. The following were the principal shipments of iron and their destination last month:—Cardiff, 1456 tons; Colombo, 1039 tons; Valencia, 535 tons; Wallaroo, 882 tons; Bombay, 4008 tons; Charlottetown, 528; Christiania, 750 tons; Gottenburg, 2537 tons rail. Coal shipments foreign were: Cardiff, 295,629 tons, compared with 306,205 tons; Newport, 41,369 tons, compared with 54,996 tons; Swansea, 59,404 tons, compared with 52,320 tons; and Llanelly, 3769 tons, compared with 4573 tons. Coal coastwise: Cardiff, 70,437 tons, against 70,127 tons; Newport, 67,684 tons, against 73,579 tons; Swansea, 18,134 tons, against 23,593 tons; and Llanelly, 7310 tons, against 8541 tons. Patent fuel: Cardiff, 12,248 tons, compared with 7053 tons; and Swansea, 9743 tons, compared with 12,276 tons.

Vice-Chancellor Malins has made an order in the Chancery Division for the compulsory winding-up of the West Swansea Colliery Company.

Messrs. T. Cordes and Co., proprietors of the Dos Works, Newport, have given notice of a 10 per cent. reduction in wages. This is the first general reduction in wages made since the establishment of these works. The shareholders of the Newport (Old) Dock Company have again no dividend to declare, although the accounts present a more favourable aspect.

REPORT FROM THE FOREST OF DEAN.

Nov. 15.—On several occasions we have adverted to the sufferings among the working population of the Forest, and last week we again remarked upon it, more especially as it affected the western side, and specially round about Parkend. On Wednesday (yesterday) an important and influential meeting was held at the Speech House relative to the prevailing distress, and to consider and devise means for its alleviation. The Rev. E. Machen, of Eastbach Court, presided, and was supported by a good number of neighbouring gentlemen, including Sir J. Campbell, Sir Thomas Crowley Bovey, Capt. Dighton, Capt. Brain, Mr. E. Crawshaw, Mr. A. Hilder, &c., as well as a number of Episcopal and non-Conformist ministers. The meeting was held in the large speech room, which was well filled. The first resolution recognised the existence of the prevailing distress throughout the Forest, but most painfully felt in West Dean. The Rev. Thomas Nicholson, of Yorkley, went most fully into the matter, and in the course of a telling speech he directed the attention to the fact that about 30 works, including iron mines, collieries, steelworks, and Parkend furnaces and tinworks in West Dean, which formerly employed many people, were now still and inactive. He estimated the population of the Forest at 25,000, 20,000 of whom were moderately well off, i.e., were not oppressed with absolute want, the supporters having partial employment at least, but the remaining 5000, he believed, were all starving, and he instanced some cases painfully illustrative of his views, and Sir J. Campbell signified his assent that it was not an overdrawn picture. Mr. Nicholson continued—what had brought about that state of things? He did not like to touch it, but would read an extract from a speech of Mr. Macdonald, in which he counselled the men only to work part time to reduce the output. There was the mischief.

Men of that class, who were evil counsellors, led men into strikes and other evil combinations, and in his opinion they had brought about it this sad state of things. But what could be done to alleviate the distress? He had received from political, denominational, and other friends various sums which would enable him to distribute 400 loaves of bread weekly for ten weeks, but he hated the idea of charity, and the people wanted not charity, but work. And he thought that the Government should furnish work by constructing much needed roads, &c. Sir Thomas Crowley Bovey proposed a resolution to ask the Lords of the Treasury to "assist" in finding employment, but this found little favour, only a few voting for it. But another being proposed in its place laid the onus on the Government to initiate the work, and this was carried without any opposition. This resolution carried a memorial to be sent to the Lords of the Treasury through the Office of Woods and Forests.

Sir J. Campbell delivered his personal opinions on some points, but said nothing officially. In the course of his remarks he mentioned the gratifying fact that he had put 40 men on to some work, which opportunity was needed to be done just now, and which would last some time. The memorial will be for signature at Coleford, &c., for some little time before it is forwarded. The meeting, notwithstanding some differences of opinion, was a friendly kind throughout, and presented a very special view of sympathy and humane feeling. Several other gentlemen besides those named took part in the proceedings by delivering addresses, but we have only time and space to furnish the gist of the meeting as bearing on the object which called it together. We hope that the "red tape" of officialism will not strangle the laudable proposal, but that means will be furnished to promptly second the object; but it is right to note that whilst some are very sanguine others are extremely doubtful of success with "my lords."

The trade of the district continues without much variation from what it has been for some time past, sometimes improving a little, and at other times sinking again somewhat, but not extensively either way, and this mostly applies to the eastern side.

ROTARY SUPERHEATED STEAM-ENGINE.

The invention of Mr. JAMES APPERLEY, of Stroud, Gloucestershire, relates to rotary engines in which the steam is superheated during its passage to and through the engines, and the impulsive force of the elastic fluid moving with velocity is utilised. To this end the engine and superheater are combined in one, and consist chiefly of an outer stationary casing supported upon a suitable bed plate or foundation, and an inner revolving drum or cylinder mounted upon an axle carried from the bed plate. The outer casing is composed of two annular or serpentine concentric channels, or chambers, or passages, the inner one being the steam superheating chamber, and the outer one forms a part of the flue for the passage of the heated combustible gases, or it may be the chamber in which they are consumed. The entrance pipe or passage for conducting the steam from the boiler to the superheating chamber is commanded by a rotary or other valve rotated automatically. The inner periphery of the annular steam superheating chamber is formed by a series of partitions arranged tangentially, between which are parallel passages leading to the metal cylinder or drum, which is so mounted as to be capable of free rotation within this outer casing. This metal cylinder is provided with a continuous spiral or volute passage, which is composed of a series of alternate enlargements or contractions, triangular or pear-shaped in cross section. The opening or mouth of this passage is at the periphery of the cylinder, and is carried around the cylinder a sufficient number of times (approaching the centre) to obtain the desired result—the expansion or condensation of the steam. The inner or open end of this spiral passage, which is near the centre of the cylinder, commanded by a rotary valve or cock, and may open out into a cooling chamber or condenser, so as to obtain the additional aid of a vacuum. The steam entrance and exit valves are operated automatically by means of cams or eccentrics on the axle of the cylinder or drum, and in any other suitable manner.

In starting the engine the communication between the furnace flue and the concentric heating flue of the engine is to be opened, or when the gases of combustion are burnt therein they are to be first lit, so as to heat the engine and prevent condensation of the steam on its first admission; the ordinary saturated steam is then to be freely admitted into the annular chamber of the case, and passing by the tangential passages, will enter in at one or more of the ports leading to the spiral steam passages, and in its rush through them to the condenser or open air will impinge in succession on the heads of the triangular enlargements of the passage, and thus impart a rotary motion to the drum or cylinder by a rapid succession of impulses. When the outer case becomes heated by the passage through it of the combustible gases or the combustion of gases therein, the entrance and exit passages to and from the engine are to be allowed to be acted upon automatically; and the mechanism provided for this purpose is so arranged as to be capable of adjustment, both as to the number of times the valves are to be opened during one revolution of the drum, and the duration of time they remain open, so as to obtain the maximum effect due to the expansion of the superheated steam. In some cases it may be desirable to provide several entrances or mouths by which the first of the spiral passages may be fed from the tangential passages of the superheating chamber; one way of attaining this object is to cut narrow grooves in the periphery of the cylinder of a depth sufficient to enter or cut through some portion of the pockets leading to the first spiral passage. These grooves are to be of such a width as to obtain a wire-drawn action of the steam in its endeavour to enter the said spiral passages, and the frictional action of the steam will be necessarily in the direction of the rotation of the drum.

BICTON CONSOLS SILVER-LEAD MINING COMPANY (LIMITED).

Full particulars respecting this Mine may be had on application to the Secretary—Mr. Wm. Ward, Crosby House, Bishopsgate, London.

MESSRS. HARLAND AND CO., STOCK AND SHARE DEALERS, 38, GREAT ST. HELEN'S, BISHOPSGATE STREET WITHIN, LONDON, E.C.

MR. GEORGE BUDGE, STOCK AND SHARE DEALER, 4, ROYAL EXCHANGE BUILDINGS, LONDON, E.C. (Established 27 years), has SPECIAL BUSINESS in—Dolcoath, Carn Breva, Wye Valley, Van, Grogwillyn, West Craven Moor, Great Laxey, Roman Gravel, Chapel House, Alltall, Colliery, Devonport and Tiverton Brewery, Huttall, Cambrian, Llanrwst, Eschegrey, Parys Mountain, Holmshush, Cakenore Colliery, Bodliff, Chicago, Bedford Union, Mynydd Gwlad, Wheel Costes, Wheel Peacor, Prince of Wales, L.L.L. Chontales, Derwent, Great Holway, Improved Wood Pavement, Lisburne, Mellanear, West Mostyn, and Halcomb Shale. SPECIAL BUSINESS in Cambrian shares. LIVINGSTONE CONSOLS.—Mr. BUDGE is prepared to receive applications for these Shares, which he believes will advance in price.

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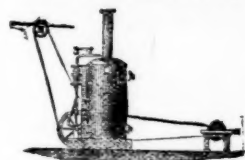
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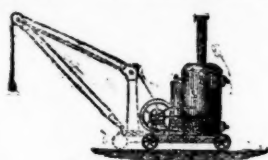
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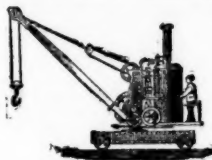
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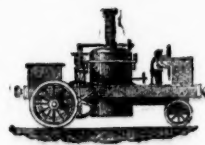
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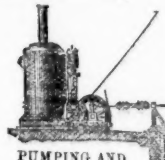
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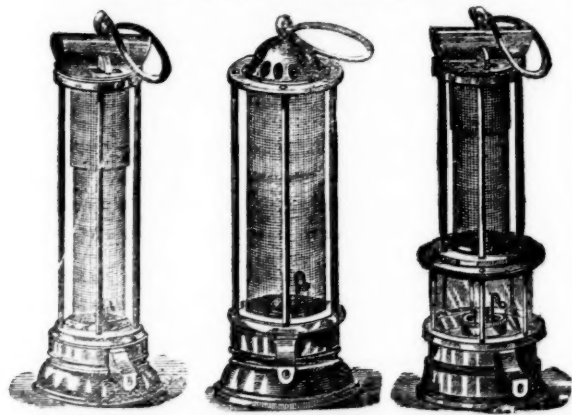
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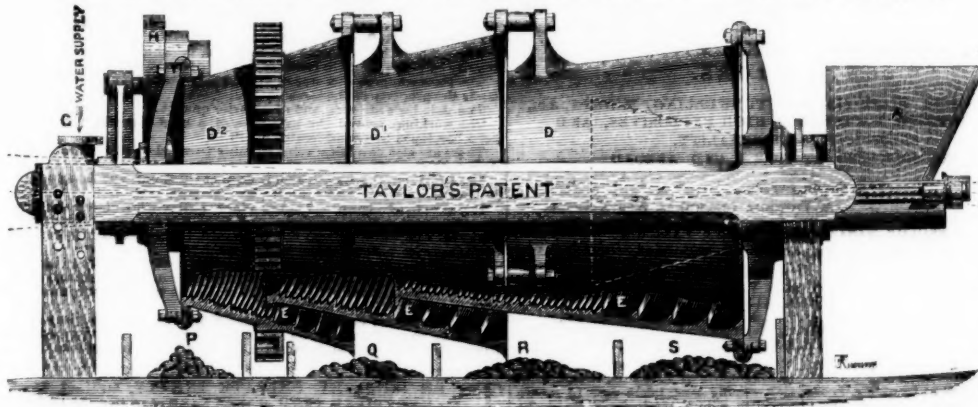
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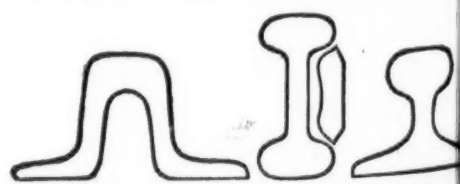
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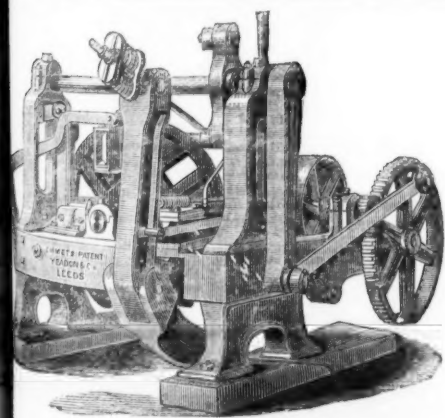
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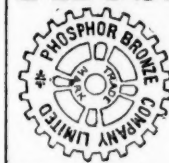


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100	Fox, Samuel, and Co. [L.]	5 0 0
100	General Mining Ass. [L.] (£ returned)	9 0 0
20	Great Western Coal Co. [L.]	17 0 2
15	Gwynne Hill Colliery Co. [L.]	2 0 0
15	Hopkins, Gilkes, and Co.	2 0 0
50	Knowles, Andrew, and Sons [L.]	11 0 0
10	Llay Hall Coal, Iron, & Firebrick Co.	17 0 0
5	Littledale Woodside Coll. Co. [L.]	10 0 0
10	Lyfny, Ogmogre, & Tondra Co. [L.]	50 0 0
10	Lydney and Waplog Iron Ore [L.]	8 5 0
10	Marbella Iron Ore Co. [L.]	10 0 0
10	Mersey Steel and Iron Co. [L.]	8 0 0
10	Midland Iron Co. [L.]	8 0 0
5	Mold Argued Colliery Co. [L.]	8 0 0
10	Monkland Iron and Coal Co. [L.]	8 0 0
10	Mwyndy Iron Ore [L.]	10 0 0
100	Nant-y-Glo and Blaiana (S p.c. pref.)	100 0 0
20	Nerbudda Coal and Iron [L. & Red.]	20 0 19
20	New Sharston Collieries [L.] Pref.	2 0 0
100	Newport Steel and Iron Co. [L.]	10 0 4
10	Northampton Coal, Iron, & Wagon [L.]	8 0 0
1	Norton Green Coal Co. [L.]	1 0 0
35	Palmer's Shipbuilding and Iron [L.]	25 0 0
100	Parkgate Iron Co. [L.]	45 0 0
20	Patent Nut and Bolt Co. [L.]	14 0 0
20	Patent Shaft and Axletree [L.]	10 0 0
50	Peatall Coal Co. [L.]	15 0 0
50	Phoenix Beamworks Co. [L.]	40 0 0
50	Rhymney Iron Co. [L.]	50 0 0
10	Richards and Co. [L.]	10 0 0
100	Sandwell Park Colliery Co. [L.]	100 0 0
50	Ditto New	10 0 0
50	Rhotts Iron Co. [L.]	10 0 0
100	Sheepbridge Iron and Coal [L.]	55 0 0
50	Silkestone & Dodworth Cl. & Iron [L.]	27 0 0
50	Skerne Ironworks [L.]	30 0 0
20	Somersetshire Iron Co. [L.]	50 0 0
25	South Wales Coal Co. [L.]	21 0 0
100	Staveley Iron and Coal Co. [L.]	60 0 0
100	Ditto Ditto	10 0 0
10	Swansea Valley Steam Coll. Co. [L.]	10 0 0
100	Thames Iron Company	100 0 0
50	Tredgare Iron and Coal Co. [L.]	20 0 0
25	Ditto B. shares	25 0 0
100	Uverston Mining Co. [L.]	12 0 0
100	Vancouver Coal Co. [L.]	8 0 0
50	Vickers, Sons, & Co. [L.]	100 0 0
50	Welsh Ironworks Co. [L.]	50 0 0
25	W. Cumberland Iron & Steel [L.]	20 0 0
10	West Moston Coal [L.] (12 p.c. pref.)	5 0 0
5	West Swansea Colliery Co. [L.]	5 0 0
10	Whitehaven Iron Co. [L.]	10 0 0
100	Wigan and Whiston Coal Co. [L.]	70 0 0
100	Wigan Coal and Iron Co. [L.]	75 0 0

WAGON COMPANIES

10 Birmingham Wagon Co. [L.]	10 0 0.. 19%
10 Ditto, 2nd issue	4 0 0.. 12
5 Ditto, pref., 5 per cent.	10 0 0.. 12
20 British Wagon Co. [L.]	10 0 0.. par
10 Gloucester [L.]	10 0 0..
10 Ditto, 5th issue	10 0 0..
10 Met. Rail. Car. and Wagon Co. [L.] ..	5 0 0.. 13
5 Ditto, pref., 6 per cent.	5 0 0.. 6
10 Midland	10 0 0..
20 North Central Wagon Co.	20 0 0.. 27%
5 Rail. Car. [L.] (Oldbury)	5 0 0.. 6%
5 Ditto, pref., 6 per cent.	5 0 0.. 6%
20 Sheffield Wagon Co. [L.]	15 0 0.. 3%
10 Yorkshire Wagon Co. [L.]	10 0 0.. 4%

TELEGRAPH COMPANY

TELEGRAPH COMPANIES.		
Anglo-American	100	0 00. 87 1/2
Brazilian Submarine	10	0 00. 6 1/2
Direct United States Cable	20	0 00. 12 1/2
Eastern	10	0 00. 7 1/2
East. Exten., Australia and China...	10	0 00. 7 1/2
Great Northern	10	0 00. 7 1/2
Indo-European	25	0 00. 19
Mediterranean Extension	10	0 00. 2 1/2
Reuters	8	0 00. 9
Submarine	100	0 00. 230
West India and Panama	19	0 00. 2 1/2
Western and Brazilian	20	0 00. 4 1/2

3000	West Wheel Peavor, t, Redruth	0 10 0...	—	...	13 15
600	West Wheel Seton, c, Camborne...	47 0 0...	20	...	13 15

MISCELLANEOUS

Atlantic and Great Western Leased	100	0 00	88
Lines, Rental Trust	21	10 00	58
5 Australian Agricultural	21	10 00	58
6 Austral. Mort. Land and Finance [L.]	8	0 00	43
0 Averside Engine [L.]	7	0 00	8
1 Baltimore and Ohio, 6 per cent.	100	0 00	104
Brighton Aquarium [L.]	10	0 00	108
Cent. of N. C. Mort., 6 per cent.	100	0 00	107
Cent. Pacific Calif., 1st Mort.	100	0 00	107
6 City of London Real Property [L.]	12	00 00	15
Copper Miners of Eng. (7 p. c. p. st.)	25	0 00	
5 Diamond Rock Boring	4	10 00	26
English and Foreign Credit	8	0 00	918
Fore Store Warehouse [L.]	10	10 00	11
Posters, Poster, and Stationery Co. [L.]	10	10 00	11
Gen. Phos. & Chem. Works Co. [L.]	8	0 00	
Greenhill [L.]	1	0 00	1
Kit Hill Tunnel [L.]	1	0 00	1
Hudson's Bay Company	17	0 00	918
Huntington Copper and Sul. Co.	9	0 00	145
Illinois Central, \$100 shares	100	0 00	83
Illinois & St. Louis, 1st Mortgage	100	0 00	83
Ditto, 2nd Mort., 7 per cent.	100	0 00	83
Illinois Cent. Sinking Fund, 5 p. cent.	100	0 00	98
Ditto, 6 per cent.	100	0 00	108
Imperial Credit [L.]	7	10 00	74
Ditto, Surplus Certificate	100	0 00	100
Lehigh Val. Con. Mort., A & B, p. cent.	10	0 00	76
Lehigh Valley	8	0 00	918
National Discount [L.]	8	0 00	918
N. Cent. Rail. Con. Mort., 6 per cent.	10	0 00	83
Pawson and Co. [L.]	8	0 00	1
Peninsular and Oriental Steam	80	0 00	108
Pennsylv. Gen. Mort. 6 p. cent., 1910	100	0 00	105
Ditto, Con. Sink. Fund, 5 p. ct., 1st	100	0 00	94
British Am. Invest. Con. Mort., 6 p. cent.	100	0 00	185
Ditto, 6 per cent. Preference	100	0 00	120
Silber Light (ord. sh.)	10	0 00	
Suez Canal shares	20	0 00	
Telegraph Construc. & Mainte. [L.]	12	0 00	27
Ditto, Second Bonus Three per Centa	10	0 00	21
Union Pacific Land Grant, 1st Mort.	100	0 00	103
Union Pacific Railway, 1st Mort.	100	0 00	107

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